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A MECHANICAL ACCOUNT OF THE Non-Naturals:

Being a Brief EXPLICATION Of the Changes made in Humane Bodies, BY AIR, DIET, &c. TOGETHER With an Enquiry into the Nature and Use of BATHS upon the same Principles.

To which is prefix'd, The Doctrin of ANIMAL SECRETION in several Propositions.

By JER. WAINEWRIGHT, M. D

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THE PREFACE.

TO attempt any Thing for the Improvement of useful Arts, especially that of Medicine, *which is of the greatest Benefit to Mankind, is a Debt that every capable Person owes to the Publick; all Civil Societies having a Right to the Property of private Persons for the Common Good.*

Whether the following Papers are like to answer that End, I leave to the Censure of capable Judges; for it is not every Pretender to Medicine, of how great Repute soever, that is a competent Judge of some demonstrated Truths. And tho' I do not confine my self to Geometrical Reasonings, yet I'm sure that he who understands not something of Euclid, *is unfit to pass his Censure upon this Undertaking. I do not say that the Practice of Physick ever will be, much less that it now is, the Object of* Mathematical *Certainty: But this I dare assert, That what Improvements there have been, or are likely to be made in*

the Theory of Medicine, *are only under the conduct of* Arithmetick *and* Geometry.

A Humane Body is a curious Machine, *and so far exceeds the Workmanship of the most Nice and Skilful Artificer, as Divine Wisdom surpasses the Understanding of a finite Mind, but yet it is subject to the same Laws of Motion, by which the infinitely Wise God governs the Universe. 'Tis compos'd of* Solids *and* Fluids, *both govern'd by the Laws of* Gravitation, Impulse *and* Reaction, *and what changes are brought about in the* Animal Oeconomy *by the motion of Matter, under the conduct of these Laws, can no way be estimated without some assistance from the* Mathematicks.

It is a Maxim universally receiv'd among Physicians, that Medicine *should begin were Philosophy ends; and 'tis undoubtedly a necessary qualification in a Physician, to be a good Philosopher; but all the Philosophy that has yet appear'd in the World, is no better than Trifling Romance, except what hath been writ by the famous Sir* Isaac Newton, *and some few others, who have built their Philosophical Reasonings upon* Mathematical *Principles. The wonderful Discoveries this Great Man has made by* Geometrical *Reasonings on Matters of Fact, are truly surprizing, and I question not but if the like Me-*

Method were made use of for searching into the Causes of Diseases, and the Nature of Medicines by as good a Head, that a short time would discover something as remarkable in our Little World, as that Illustrious Author has done in the Great.

We have some Earnests of what we may expect in this way, from the Writings of Borelli *and* Bellini, *and in our own Island the Learned* Pitcarne, Mead, Cheyne, *and some few others, who have made greater Discoveries in the* Animal Oeconomy *then many Ages before can boast of. The Method these Gentlemen begun, I have pursu'd; and if what I've writ be of any Use to the Publick, 'tis a Recompence for my Labour; if not, I cannot help it, I am not the first that has been mistaken in his own Performances.*

I have prefix'd to the Book some Propositions concerning Animal Secretion, *not only to save my self the labour of frequent Repetitions, (having occasion to refer to 'em so often) but because little or nothing has been said to the purpose by any, on this Subject, except what we have in some of the forementioned Authors. Besides, there is no part of the Art better deserves our enquiry into, than the Doctrine of* Secretion, *since there are but few Distempers which admit of a Cure without encreasing or lessening some Evacution.*

To the Chapter of Air, *I have subjoin'd some Thoughts of the operation of the* Bath, *whether* Temperate *or* Cold, *upon a Humane Body, and have accounted for the effects of* Bathing, *from either the* Weight *and* Cold, *or the* Warmth *and* Moisture *of* Bath-*Waters. I have also calculated the Weight of Water we sustain in* Bathing, *and demonstrated, that the constant expulsion of Perspirable Matter thro' the Pores of the Skin, is not sufficient to resist the entrance of Water into the Body when we Bathe; and also shew'd how the wearing of Flannel becomes prejudicial to weak People.*

The other Parts of my Discourse fall naturally under their proper Heads. As to the Style, tho' it be rough, yet if 'tis but Intelligible, 'twill be enough for my Purpose. I must confess the uncorrectness of the whole Work, which had yet been more so, had it not been for the Inspection of my Ingenious Friend Dr. Coats: *But be it as it will, I'm sure it was design'd well, and may, if read without Prejudice, answer its Design, at least so far as to excite a better Hand to correct its Errors and supply its Defects.*

Of

Of Animal Secretion.

PROP. I.

A *Fluid* muſt have its compounding Parts ſmall, ſpherical, or approaching thereto, ſmooth, or ſuch as can ſlide eaſily one over another, and if *Homogeneous*, the Parts muſt be of equal denſity, by the 147 Propoſition of *Borelli, De Motibus Naturalibus a Gravitate factis*,

PROP. II.

Fluids preſs *Undiquaque*, and the direction of their preſſure is in every Point perpendicular to the ſides of the containing Veſſel, and therefore *Secretion* is perform'd by a compoſition of two Motions, one direct, and the other tranſverſe.

PROP. III.

A *Heterogeneous Fluid* at reſt in the Body, and equally preſs'd, the moſt liquid Part is forc'd out firſt.

PROP. IV.

A *Heterogeneous Fluid*, such as the Blood, whose compounding Parts are of different Densities, upon its Stagnation will percipitate its heavy, and elevate its light Parts, and they all in time will take their Places according to their Specifick Gravities, and where the *Fluid* does not Stagnate, the separation of the heavy Parts from the light, will be in proportion to the slowness of the motion of the *Fluid*.

PROP. V.

The red Fibrous Part of the Blood, upon its Stagnation, retires into the center, and forces the *Serum* to the sides of the containing Vessel.

COROL.

The slower the Bloods Motion is, the more *Serum* is separated.

PROP. VI.

Fluids resist the Motion of such Bodies most, whose Surfaces are greatest, in proportion to their Solidities, or in other Words, whose Specifick Gravities are the least.

PROP.

PROP. VII.

The moſt viſcid Parts of the *Serum* are lighteſt, *viz.* ſuch as are ſeparated in the Glands of the *Noſe*, *Mouth*, *Palate*, *Windpipe*, *Stomach*, *Guts*, &c. being theſe ſwim in Water, which is lighter than *Serum*.

COROL. *to the two laſt* PROP.

The moſt viſcid Part of the *Serum* of the Blood is the leaſt ſuſceptible of Motion, or moved with the greateſt difficulty through the Arteries.

PROP. VIII.

A *Fluid* forc'd thro' a Concave Cylinder, moves with greater celerity at the *Axis*, than at the ſides, *(by the 215th Prop.* of *Borelli*, *De mot. natural. a gravitate fact.)* and much more ſo through a Concave Cone.

PROP. IX.

(*a*) *Baglivi* hath obſerv'd the motion of the Blood ſwifteſt in the middle of

(*a*) De Praxi Medica, *p.* 398.

the

the Artery of a *Frog*, and therefore the moſt light Parts being leſs ſuſceptible of Motion, will be forced to the ſides of the Arteries where there is the leaſt Motion, ſo that where there is the leaſt Motion, there will the lighteſt (being the moſt Viſcid) (*by the 7th Prop.*) part of the *Serum* be ſeparated.

COROL.

The Viſcidity of the ſeparated *Fluid* will be reciprocally, as the Celerity of the Blood at the Orifice of the ſeparating Canal.

COROL. II.

The Velocity of the Blood at the Orifice of the ſeparating Canal, being as the number of Plications in the complicated Artery; (by the 40th *Prop.* of *Bellini de motu Cordis*) therefore the Viſcidity of the ſecerned Matter, will be as the number of Plications in the complicated Artery.

PROP. X.

When the motion of the Blood is too ſlow, the moſt ſerous Part of the Blood is thrown upon theſe Arteries, which are the ſmalleſt, moſt complicated, or

at the greateſt diſtance from the Heart. For the motion of the Blood being too ſlow, more of the red part of it will move along the *Axis* of the Artery than before (*by the* 5*th Prop.*) therefore the red Part will move with much greater celerity than the *Serum*, (*by the* 8*th and* 9*th Prop.*) and conſequently thro' ſuch Arteries where there is the leaſt reſiſtance, *viz.* thro' the wideſt, the leaſt complicated, and thoſe neareſt the Heart, for which reaſon the Serum will be forced upon ſuch Arteries as are the ſmalleſt, moſt complicated, or at greateſt diſtance from the Heart.

PROP. XI.

A *Gland* is a complicated Artery (over whoſe outward Coat, as in all the Arteries and Veins, are branches of Nerves to ſerve their ſpiral Contortion) which ſends Excretory Veſſels out of its ſides, after which it degenerates into a Vein. This is Dr. *Cheyne*'s 1*ſt Prop.*

PROP. XII.

The *Inneſtines* are a Gland, and the *Lacteals* are the Secretory Veſſels. This is Dr. *Cheyne*'s 4*th Prop.*

PROP.

PROP. XIII.

The Orifices of the Excretory Veſſels of every Gland are circular, being all the Veſſels in which the Fluids of the Body move, are either Concave Cylinders, or Cones; for the preſſure of a Fluid being always perpendicular to the ſides of the containing Veſſel, and being qual at equal diſtances from the center, the ſides muſt be every where equally diſtracted, *viz.* a Section perpendicular to the *Axis* of the Veſſel, muſt be a Circle, and conſequently the Veſſel be either *Cylindrical* or *Conical*. This *Prop.* is more fully demonſtrated in Dr. *Pitcarne*'s *Diſſertation. de Circulatione Sanguinis*, &c.

COROL.

The Orifices of the Excretory Veſſels of different Glands, differing only in their Magnitude, the Fluids ſeparated in different Glands, will differ only in degrees of *Coheſion* and *Fluidity*.

COROL.

COROL. II.

Any peccant Matter in the Blood may be evacuated by any of the Glands, provided their Orifices be but sufficiently enlarged.

COROL. III.

The encreasing of one Evacuation will lessen another, and *Vice Versa*.

PROP. XIV.

All the *Conglomerate Glands* have Coats made of Muscular Fibres, with which they force out their Contents by contraction, and the more in quantity, or the more forcibly any secern'd Matter is to be expell'd, the stronger are the Muscular Fibres.

PROP. XV.

The relaxed Coat of any Gland, encreases the Viscidity of the secerned Matter, and *Vice Versa*, for the secerned Matter will grow much more Viscid by staying longer in the Gland, the thin Parts being evaporated by the heat of the Body, the rest will be more Viscid.

COROL.

COROL.

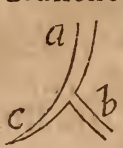
Opiates, *Drunkenneſs*, and whatever makes an univerſal Relaxation, encreaſe the Viſcidity of the Matter ſeparated in all the *Conglomerated Glands*.

PROP. XVI.

Such Glands whoſe compounding Arteries are moſt complicated, ſecerne the moſt Viſcid Matter from the Blood.

Demonſtration.

Let there be a branched Canal of the annex'd Figure and let the extremity of one of the Branches *c* be ſhut up and the other Branch *b* be open, then by an Engine force thro' the Trunk *a*, any kind of Viſcid Liquor, ſuch as the Blood, or whoſe compounding Parts are ſome more, and ſome leſs Fluxil, and it will equally run into both the Branches, till the Branch *c* be full, but after that, what ſhou'd move through *c*, muſt paſs thro' *b*, ſo that the whole Liquor that paſſes thro' the Trunk *a*, muſt likewiſe, in the ſame time, paſs thro' the Branch *b*; now *b* being much ſtraiter than *a*, the Li-



Liquor muſt paſs with greater celerity through *b* than *a*, (*by the third Corollary of the* 10*th Theorem of Mr.* Keill's *Lectiones Phiſicæ.*)

So that ſuch Parts of the Liquor as are moſt eaſily moved, will firſt paſs the Branch *b*, and the Parts that are leaſt ſuſceptible of Motion, or in other Words, thoſe which are moſt Viſcid, will be ſoliciting their entrance into the Branch *c*, but this Viſcid Matter cannot enter without forcing ſome of the moſt moveable or Fluid Part of what is contain'd in *c* into *b*, ſo that *c* will conſtantly fill with Viſcid Matter, till it can hold no more. If therefore the extremity of the Branch of any Artery be totally obſtructed, it is hereby diſpoſed to fill with the moſt Viſcid Matter the Blood can ſupply, and that for this reaſon, *viz.* becauſe the progreſſive Motion of the Blood thro' that Branch muſt ceaſe, and in ſuch Branches of any Artery, where the motion of the Blood is moſt retarded, thro' that Branch will the moſt Viſcid part of the Blood paſs, as the moſt Fluid will in thoſe Branches where there is the leſt reſiſtance to the Motion of the Blood. Now in every complicated Artery, the reſiſtance being greater than in a ſtrait one,

the

the motion of the Blood will be ſlower, and that in proportion to the number of Plications in the complicated Artery; therefore in the Arteries which are moſt complicated, the Motion of the Blood in 'em being the ſloweſt, its Viſcidity will be the greateſt, and therefore ſuch Glands whoſe compounding Arteries are moſt complicated, ſecerne the moſt Viſcid Matter from the Blood, Q. E. D.

PROP. XVII.

The quantity of Fluid Matter ſeparated in any Gland, is in compound proportion of the quantity of Blood, its celerity at the Orifices of the Excretory Veſſels, the wideneſs of the Orifices of theſe Veſſels directly, and the Viſcidity of the Blood reciprocally.

Demonſtration.

The celerity of the Bloods motion, the wideneſs of the Orifices, and the Viſcidity of the Blood, being given, the quantity ſeparated muſt be as the quantity of Blood directly, for a greater quantity ſeparates more, and a leſs quantity ſeparates leſs.

The

The quantity of Blood, its Viſcidity, and the wideneſs of the Orifices being given, the quantity ſeparated, will be directly, as the celerity, for a greater celerity gives a greater quantity, and a leſs celerity a leſs.

The quantity of Blood, its Celerity and Viſcidity being given, the quantity ſeparated will be directly as the wideneſs of the Orifices, for the wider the Orifices, the more will be ſeparated and the ſtraiter the leſs.

The Quantity and Celerity of the Blood, and the wideneſs of the Orifices being given, the Quantity ſeparated, will be reciprocally as the Viſcidity of the Blood, for the greater the Viſcidity, the leſs will be ſeparated, and the leſs the Viſcſdity, the more; therefore none of theſe being given, the Quantity ſeparated will be as the quantity of Blood, *&c.* Q. E. D.

PROP. XVIII.

An encreaſed quantity of Blood, encreaſes the Fluid Secretions, in a proportion greater than the Viſcid.

Demonſtration.

The quantity of Blood being encreaſed, the Diameter of all the Veſſels will be enlarged, but in different proportions, for the ſame force being the encreaſed quantity of Blood applied to the leſs complicated Arteries, will diſtract 'em, or enlarge their Diameters more than it will the more complicated, being the reſiſtance in theſe is greater than in thoſe, and that in proportion to the number of the Plications, one Artery hath more than another; now the quantity of ſeparated Matter being, *Cæteris paribus*, as the wideneſs of the ſeparating Canal, (*by the laſt Prop.*) the quantity ſeparated in the leſs complicated Artery whoſe Diameter is more enlarged in this Caſe, will be greater than what is ſeparated in a more complicated Artery, and ſeeing ſuch Glands whoſe compounding Arteries are moſt complicated, ſecern

cern the moſt viſcid Matter from the Blood, and the leaſt Complicated the moſt Fluid *(by the 16th Prop.)*: Therefore an encreaſed quantity of Blood by encreaſing the Diameter of the leſs complicated Arteries, more than of the more complicated, encreaſes the Fluid Secretions more than the Viſcid, Q. E. D.

PROP. XIX.

A decreaſed Quantity of Blood leſſens the Fluid Secretions more than the Viſcid: This needs no Proof, being the Reverſe of the laſt Propoſition.

PROP. XX.

An encreaſed Celerity of the Bloods Motion, encreaſes the Fluid Secretions more than the Viſcid, and *Vice Verſa*. A decreaſed Celerity leſſens the Fluid Secretions more than the Viſcid.

Demonſtration.

The Celerity of the Bloods Motion being greater, the *Impetus* by which the Arteries are diſtracted, or their Diameters enlarged, will be greater, and ſo exert its force more upon the leſs complicated Arteries, than upon ſuch as are more Complicated, and conſequently promote the Fluid more than the Viſcid Secretions, (for the Reaſons given in the Demonſtration of the 18th *Prop.*) and becauſe an encreaſed Celerity, will, by breaking the Blood into ſmall Parts, render it more Fluxil, and thereby ſupply a greater quantity of ſuch Particles, as will paſs the Glands, whoſe Diameters are the leaſt, therefore upon this account alſo an encreaſed Celerity of the Bloods Motion, will encreaſe the Fluid Secretions more than the Viſcid, Q. E. D.

PROP. XXI.

An univerſal Enlargement of the Orifices of all the Glands, encreaſes the Fluid Secretions more than the Viſcid, and *Vice Verſa*, an univerſal Contracti-

on

on leſſens the Fluid Secretions more than the Viſcid.

Demonſtration.

The Diameters of the ſmalleſt Orifices being enlarged, are big enough to ſecern the Viſcid as well as the Fluid Matter, and becauſe the Matter ſecerned in different Glands, differ only in degrees of *Coheſion* and *Fluidity (by the 1ſt Corollary of the 13th Prop.)* therefore the Orifices of the ſmall Glands being enlarged, the more Viſcid Matter that uſed to be ſeparated in other Glands, will be ſeparated in theſe, and therefore leſs will be ſeparated in theſe Glands that are fitted for Viſcid Secretions, and more in thoſe fitted for the Fluid. Therefore an univerſal enlargement of the Orifices of all the Glands, encreaſes Fluid Secretions more than Viſcid, Q. E. D.

PROP. XXII.

An encreaſed Viſcidity of the Blood decreaſeth the Fluid Secretions, more than the Viſcid, and *Vice Verſa.* An encreaſed Fluidity encreaſeth the Fluid Secretions more than the Viſcid.

Demonſtration.

A decreaſed Celerity of the Bloods Motion, leſſens the Fluid Secretions more than the Viſcid *(by the 20th Prop.)* but the Celerity decreaſeth, as the reſiſtance encreaſeth; now the reſiſtance is greater when the Blood is moſt Viſcid, being it paſſes with greateſt difficulty through the Capillary Arteries; therefore an encreaſed Viſcidity, by leſſening the Celerity, decreaſeth the Fluid Secretions more than the Viſcid. Q. E. D.

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The Introduction.

THat I may Treat more Methodically of the Advantages to be reaped by a regular Use of the Non-Naturals, both with respect to the Preservation of Health, and the Cure of Distempers, I shall explain some of the most obvious Phænomena in Diseases both Chronical and Acute, that it may appear how well adapted they (the Non-Naturals) are by a Judicious Application, not only to confirm our Health, but restore it: And that in many Cases they will prove more efficacious than the most Celebrated Drug. We have Instances more than enow of such as by Change of Air, or a Luxurious Diet for one more Temperate, (which was Cornaro's Case) or Flesh-meat, for Milk and Vegetables) or of such who have taken long Journies, or made long Voyages, or by Spontaneous Vomiting, Purging or Sweating, have been Cured of such Distempers as would not yield to any Medicine, tho' never so generous.

The Method I ſhall Purſue, will be firſt to Account for ſome General Diſorders in the Stomach; *then to give a ſhort* Hiſtory *and* Theory *of Three Remarkable Chronical Diſtempers,* viz. *the* Aſthma, Conſumption, *and* Dropſie; *and after that, to explain ſome of the moſt notorious Symptoms in* Acute *Diſtempers, eſpecially in* Fevers: *With ſome ſhort Hints towards eſtabliſhing a better Method for the Cure of 'em, than what is followed by the generality of* Phyſicians.

A Mechanical Account OF THE *Non-Naturals*, &c.

CHAP. I.

Of the Stomach, and its Diſorders.

§ 1. 'TIS well known that the *Stomach* is deſign'd and fitted for the Digeſtion of our Meat, by which it is divided into ſuch ſmall Parcels as will paſs thro' the *Lacteals*, into the Maſs of Blood, for our Strength and Nouriſhment. 'Tis made up of *Membranous* and *Muſcular Fibres*, fill'd with Arteries, Veins, Nerves, and Glands, by which a *Viſcid* Matter is

ſeparated from the Blood, and pour'd into its Cavity, for very good Ends and Purpoſes.

§ 2. This, if increaſed, or diminiſh'd, either in its Quantity or Viſcidity, gives riſe to many diſorders in the Stomach, as loſs of *Appetite*, *Nauſea's*, *Vomiting* eſpecially in the Morning, which is common to hard Drinkers, *Diſtention* of the *Stomach* after eating, *&c.*

§ 3. The *Stomach* by the help of its Muſcular Fibres, together with the *Diaphragm* and *Muſcles* of the *Abdomen*, is enabled ſo to *toſs* the Meat about, that if that Motion be not the ſole, (according to the Learned (*a*) Dr. *Pitcarne*,) yet 'tis certainly the principal Cauſe of *Digeſtion*. The force of the Muſcles imploy'd in this buſineſs, is almoſt incredible; for if the comparative Force of the Muſcles be as their *Solidities* or *Gravities*, as he hath demonſtrated; and the force of the *Flexor Policis* be equal to 3720 Pound weight, according to the calculation of (*b*) *Borelli*: How great then muſt the force of all theſe

(*a*) Diſſertatio de Motu quo Cibi in ventriculo rediguntur ad formam ſanguini reficiendo ido neam.
(*b*) De Motu Animalium, *Par.* 1. *p.* 126.

Muſcles

Muscles taken together? * And indeed nothing else being necessary in the business of *Digestion*, but that the Parts of our Food be so divided, that their greatest *Diameters* be less than the Orifices of the *Lacteals*; the strength of these Muscles, seems more than sufficient for that Work. However be this as it will, every Body will own that the Muscles have a considerable share in it. Hence it follows, that whatever encreaseth or lesseneth Muscular Motion in general, or the Motion of the recited Muscles in particular, hastens or retards *Digestion*.

§ 4. An encreased quantity of Blood helps our *Digestion*, for Dr. *Cheyne* hath demonstrated in his third *Lemma* in the *New Theory* of *Fevers*, that *Cæteris paribus*, the strengths of different Animals of the same Species, or of the same Animal at different times, are in a triplicate Proportion of the quantities of the Mass of their Blood. And the whole Strength of an Animal is the force of all his Muscles taken together, therefore, whatever encreaseth the

* *It is as the Doctor computes equal to* 260000 *Pound Weight.*

Strength, encreaſeth the force of all the Muſcles, and of theſe ſerving *Digeſtion*, as well as others. Yet notwithſtanding the Truth of this Lemma, the quantity of Blood may be encreaſed in ſuch circumſtances, as to abate the Strength: The Æquilibrium between the Blood and Veſſels being deſtroyed, wonderfully leſſens the Strength, as is evident from ſeveral Paſſages in *Baglivi de Fibra Motrice.* The ſudden ſuppreſſion of Perſpiration, tho' it encreaſe the quantity of the Blood, as it muſt conſiderably, by *Sanctorius*'s Calculation, yet it leſſens the Strength, becauſe the retained Matter being what ought to be evacuated, ſo alters the Texture of the Blood, as to make it unfit for Muſcular Motion. Suppoſe the encreaſed quantity be join'd with an encreaſed Viſcidity, the quantity of ſmall ſeparable Parts decreaſing, as the Viſcidity encreaſeth, the quantity of *Animal Spirits* ſeparated in the *Brain*, will be leſs, and the Tenſity of the Fibres being in proportion to the *Animal Spirits* forced into them, they will not be able to *Counterpoiſe* the greater weight of the Blood, and ſo the Strength will be diminiſh'd.

§ 5.

§ 5. *Bellini* in his forty ninth Proposition *de Motu Cordis*, proves, That if the Blood be so Vitiated, as to encrease or diminish Strength, 'tis the same as if the Blood was in a natural State, but its quantity encreased or diminish'd in the same proportion. So that the Blood when *Vitiated*, may so impair the strength of the Muscles, as to spoil *Digestion*, and yet in some cases the Blood may be so *Vitiated* as to encrease Strength according to the Proposition, and thereby help *Digestion*. Therefore a voratious Appetite and strong Digestion are no infabible Signs of a healthful State of the Blood.

We have one reason from what hath been said, why nourishing Food in little quantities, so often helps a weak *Digestion*; as also why *Hectic* People Digest their Victuals so very ill, the quantity of their Blood being so much diminished as (*c*) Dr. *Cheyne* hath made out beyond dispute.

§ 6. *Vomits*, *Bitters*, *Chalybeats*, and *Exercise*, especially in cool, dry Air, mightily promote *Digestion*, by strengthning the

(*c*) *New Theory of Fevers*, *p.* 134.

Fibres, whereby Muſcular Motion is encreaſed, as well as by leſſening the quantity of viſcid Matter, ſeparated in the Glands of the Stomach; which *Vomits* do directly, and the other by encreaſing Perſpiration, whereby other Evacuations are leſſened, for (*d*) Dr. *Pitcarne* hath proved, that the encreaſing of one Evacuation, is the leſſening of another.

Bitters and *Chalybeats* leſſen the Viſcidity of the Blood, and encreaſe its Celerity, whereby it is better fitted for the Secretion of perſpirable Matter, and alſo of *Animal Spirits*, which will ſtrengthen the Muſcular Fibres, and ſo help Muſcular Motion, as appears by the twentieth Propoſition of *Animal Secretion.*

How much *Exerciſe* in cool dry Air ſtrengthens the Fibres, and encreaſeth Health, is evident from the 7. 8. and 27. *Aphoriſms* of *Sanctorius*, § 3. compared with the 34. and 35. *Aphoriſm*, § 5.

§ 7. It is eaſie to ſhew in other Circumſtances, how neceſſary it is to relax the Fibres of the *Stomach*, when by

(*d*) Diſſertatio de Circulatione Sanguinis per vaſa minima, *p.* 33.

any

any means they are grown too *Springy*. When the Fibres of the *Stomach* are too *Tenſe*, their *Vibrations* are ſmarter, and Senſation thereby more *acute*, ſo that what before was eaſie and delightful to the *Stomach*, is now moſt ungrateful and tormenting. In this Caſe there is often grevious Heat, Pain, Sickneſs and Thirſt, and yet the *Stomach* is not able to bear the ſmootheſt Liquor without *Vomiting*.

Beſides this, the Orifices of the Glands are contracted, and thereby the *Stomach* robb'd of a great ſhare of that Slime that ſhould defend it, for the quantity of Secerned Matter, is in a compounded Proportion of the wideneſs of the Orifice, and celerity of the Fluid, by the ſeventeenth Propoſition of *Animal Secretion:* And further, the ſecerned Matter is not only leſs in quantity, but alſo thinner, and the thinner the Fluid is, the fitter it will be to diſſolve the *Acrid Salts* contained in the Blood, which by this means will be better ſtocked with them, and conſequently become a *Stimulus* it ſelf, to ſo ſenſible a Membrane as the *Stomach* is lined with. The ſmalneſs of the Secretory Veſſels, is not the only Cauſe why this

ſecern-

ſecerned Matter ſhould be more Fluid, but alſo the encreaſed Velocity, with which the Blood moves in theſe contracted Veſſels. That the Blood moves more ſwiftly in the contracted Arteries is certain, (from the 3d. *Corol.* of the 10th. *Theorem* of Mr. *Keil*'s *Lectiones Phyſicæ*) eſpecially if the Contraction be Univerſal, as it will be by conſent, as is evident from *Bellini de Stimulis*, *Baglivi de Fibra Motice*, and alſo from ſeveral of (*e*) *Sanctorius*'s *Aphoriſms.*

How the Velocity of the Bloods Motion ſhould encreaſe the Fluidity of the ſecerned Matter ſeems more difficult to account for, ſince the Blood is ſo much diſpoſed to depoſit its Serum upon its ſlow Motion, as appears by Dr. *Lower*'s *Experiment*, as alſo upon its Stagnation in a Porringer: But if we conſider that tho' the Serum be the moſt Fluid part of the Blood, yet it is however liable to great alterations as to its Fluidity, and is the moſt Fluid when moved with the greateſt celerity, this Objection will be of no force. The ſpecifick Gravity of Serum is to that of

(*e*) *Med. Stat.* § 1. *Aphor.* 41, 50, 89, *and* 91.

Water

Water, as ſix to five, according to Mr. *Boyle*'s Obſervation, but yet this Proportion muſt be various, in different Subjects.

The encreaſed Velocity in the contracted Arteries whoſe Vibrations for that reaſon are quicker, muſt needs break and divide the Blood, whereby it becomes Fluid, and ſo fitter for more Fluid Secretions, and it will likewiſe ſo mix and jumble together, the yet remaining Viſcid Parts, that they cannot in that confuſion ſeparate from the other.

§ 8. The greater or leſs quantity of *Saliva*, as (*f*) Dr. *Cockburne* hath proved, encreaſes or leſſens both *Appetite* and *Digeſtion*. And the ſame *Author* hath alſo ſhown how the greater weight of the *Air* affects this Secretion.

(*f*) Oeconomia Animalis, *p.* 15.

CHAP.

CHAP. II.

Of the Asthma.

§ 1. AN *Asthma* is a Laborious and Difficult *Respiration.* It is divided into three Species, *Dyspnœa*, *Asthma*, and *Orthopnœa.*

1. A *Dyspnœa* is a dense and quick *Respiration.*

2. An *Asthma*, properly so call'd, is a frequent and strong *Respiration*, in which all the Muscles serving Respiration, are vehemently agitated. 'Tis join'd with a *Stertor* and *Wheasing.* Sometimes *Respiration* is strong and slow.

3. An *Orthopnœa* is the greatest difficulty of Breathing, in which the Patient would be suffocated, if he did not sit upright. In all the three sorts, *Inspiration* is more difficult than *Expiration.*

These three Distempers only differing in degrees; I shall Treat of 'em all under the common Term of *Asthma.*

§ 2. An *Asthma* being only a greater or less difficulty of Breathing, whatsoever

ever then will interrupt Respiration, will cause an *Asthma*.

That Respiration may easily be perform'd, 1st, the cavity of the *Thorax* must be enlarged, that the *Air* may enter the *Lungs*.

2. The *Air* must be *Heavy* and *Elastic*, without which Properties it wou'd not sufficiently blow up the *Vesiculæ* in the *Lungs*, to make room for the passage of the Blood thro' 'em; and yet if the *Air* be either too *Heavy* or *Elastic*, it will stretch the *Vesiculæ* beyond their due extent, and thereby obstruct the passage of the Blood thro' the *Lungs*.

3. The Blood must be *Fluid*, and in fit Proportion to pass thro' the *Lungs*.

§ 3. In short then, whatever determins the Spirits in too great a quantity, or too little into the *Muscles* serving *Respiration*, (*viz.* The *Intercostals*, both *internal* and *external*, the *Subclavius*, *Serratus Anticus major*, *Serratus Posticus superior*; or *triangularis*, *Serratus Posticus inferior*, *Sacrolumbaris*, and *Diaphragma*) by elevating the Breast too much, or too little, must hinder *Respiration*: Nay if the *Lungs*, the *Aspera Arteria*, or the Membranes of the Breast, be either too lax, too dry, too much streightned by spas-

spasmodick Contraction, or windy Inflation, stuff'd with a Viscid Slime, fill'd with *Tubercles*, or Stony Concretions, if there be either Matter, or Water collected in the cavity of the *Breast*, or *Belly-Dropsies*, *Tumors* in the *Liver*, *Stomach*, *Spleen*, or *Mesentery*, in all these cases *Asthmatick* Symptoms will ensue.

§ 4. If the Blood be either too much in *Quantity*, too quick in its *Motion*, too much *Rarified*, or too *Viscid*; it will upon all these Accounts pass more difficultly thro' the *Lungs*, and therefore require the *Lungs* to be more nicely *Inflated*, than will hapen in such Circumstances, for which reason the *Patient* will be *Asthmatick*.

§ 5. A Fit of the *Periodick Asthma*, which falls most under a *Physician*'s Care, often happens once in a Fortnight (if cold bad Weather, or some irregularity in Diet bring it not on sooner) and sometimes once a Month. I know a *Lady* who hath a Fit every time her *Menses* flow; and was rather worse than better for all the Medicines she had taken for seven Years, as she told me when first I visited her: Yet by a Medicine better suited to her Case, was mightily relieved

relieved for almost two Years, and continues so yet, for ought I know to the contrary. The Fit is generally preceded by a *Flatulency*, and *Distention* of the *Stomach*; and invades the *Patient* about one or two of the Clock in the Morning, forces him, if violent, to rise out of Bed, and sit upright in a Chair: He finds a great straitness at his Breast, and strives by all means to draw a greater quantity of *Air* into his *Lungs:* His Urine is pale, and in great quantity, he can neither Cough, Sneeze, Spit, or Speak freely, the *Stomach* is now much more distended, and all heating things encrease it. The *Fit* is less after Vomiting, Purging, or Fasting: When it is violent the Heart *Palpitates*, the Pulse intermits, the Face is almost black, and the *Patient* is subject to Swooning; when it begins to abate, he Spits plentifully, and not till then; sometimes a Crude, and sometimes a Concocted *Phlegm*; which he is not very much troubled with again till the next *Paroxism.* His *Urine* is high Colour'd at the latter end of the *Fit.* All sudden alterations of the Weather give a *Fit*

Gill,

Gill, Hyſſop, Rue, Syrup of Garlick, Syrup of Sulphur, Tincture of Lavender, Spirit of Hartſhorn, Myrrh, Saffron, Balm of *Giliad*, Balſam of *Peru*, Bal. Sulphur, Aniſat, Succinat, Terebinthinat, Tincture of Sulphur, with Syrup of Ground-Ivy, Lime-Water, Infuſions of Millipides, Hore-Hound *lb. ſs.* to ſix Gallons of Beer, Vomits, Bleeding and Purging, all theſe prov'd unſucceſful in the Intervals, (*g*) as a very good Judge in this Caſe informs us.

A full Diet, and eſpecially Debauches, render the *Fit* more ſevere; a dry Air beſt agrees with the *Aſthmatick*: He is free from his *Fits* in Froſty Weather, if it be not too ſevere. Rain when it falls does not much affect him, but the preceding Vapours do; damp Houſes, fenny Grounds, high Winds, and Storms, mightily offend him: Any kind of Smoak is offenſive, but the Smoak of Wood the moſt, and that of *Dutch* Turf the leaſt. In Summer the *Fits* are both more frequent, and ſevere than in Winter. A *Fit* is generally encreas'd by the *Heat* of the Fire, or Bed, and eaſed by

(*g*) *Sir* John Floyer's *Treatiſe of an Aſthma*, p. 18. *and* 19.

open-

opening the Window. All ſtrong Liquors are prejudicial, eſpecially in the *Fit*, new Drink of all kinds is improper.

All ſorts of Viſcid, Mucilaginous, and Windy Victuals are prejudicial; Meat that ſwells leaſt in the Stomach, is beſt for the Aſtmatick.

Etmuller, *Waldſchtmicdt* and *Baglivi*, commend Vomits, *Laudan. cum Ther. Androm. Millepedes*, *Terebinthinats*, *Balſam* Peru, *Sperma Ceti*, *Anti-hyſtericks*, *Anti-epelepticks*, and Solutions of *Gum Ammoniacum*, &c.

Sir *John Floyer* hath try'd moſt of the celebrated Medicines, commended by any of our *Modern Authors* without any advantage, but found benefit by uſing the Preſcriptions of the *Ancients*, (*b*) and indeed they are much more agreeable to the *Theory* of this Diſtemper; and they who expect to be ſucceſsful in the Cure of it, muſt vary their Method according to the various Cauſes that produce it, which the foregoing *Theory* will give ſome light into.

(*b*) Vide Nicol. Myrepſ. de Antidotis, § 1. *cap.* cxxxv. Oribaſii, *lib.* ix. and *cap.* v. & Ætii Tetrab, ib. 11. Sermon. iv. *cap.* lvii.

CHAP. III.

Of a Consumption.

§ 1. A *Phthisis* is a Consumption of the *Muscular* Flesh, either with, or without, a *Fever*. 'Tis either *Original* or *Symptomatical*. The *Original* is either *Nervous*, which is call'd an *Atrophy*, or *Pulmonary:* It is the last I shall only take notice of in this Place. I shall first observe, what preceeds a *Pulmonary* Consumption: Secondly, recite the Concomitants of it; and in the next Place take notice of its consequents, in order to explain some of the most obvious *Symptoms* that attend it.

§ 2. The *Antecedents* of this Distemper are a Suppression of some natural, or preternatural Evacuation, without Correcting the Cause on which it depended, grievous Passions of the Mind, drinking too plentifully of Spirituous Liquors, an idle course of Life, night Studies, fenny, heavy and smoaky *Air*, an hereditary Disposition, Crookedness, strait

ſtrait Breaſts, any thing let fall upon the Lungs, Diſtempers ill Cur'd, and eſpeciall catching Cold in theſe Circumſtances.

The Concomitants are

1ſt. A *Cough*, which is thus diſtinguiſh'd from a *Catarrh*; 'tis owing to *Tubercles*, or ſome other Indiſpoſition in the *Lungs*, with a Senſe of weight in the Breaſt, and difficulty of Breathing, and in the beginning 'tis dry, tho' in the Progreſs of the Diſtemper, it be moiſt.

A *Catarrh* is moiſt in the beginning, and terminates in a few Weeks, yet is troubleſome and almoſt continual, whereas a Conſumptive Cough, is mild in the beginning, and returns by intervals, the Patient is Thirſty, his Tongue foul, and loſes his Appetite, and Coughs after Meat till he Vomit it up: The Voice is hoarſe, or ſqueaking, the weight is greater in one part of the Breaſt than the other, and he Coughs more, lying on one ſide, than on the other.

2. There is a Fever, loſs of Appetite, Thirſt, reddiſh Urine, quick Pulſe, red Cheeks, eſpecially after Meat, heat of

the Palms of the Hands, Soles of the Feet, and the *Hypochondres.*

3. Loſs of the Muſcular Fleſh.

The conſequences of the beginning Conſumption I have been deſcribing, which, if not cured, becomes a confirm'd one, which is attended with a new *Fever* of the *Inflammatory* kind, as *Pleuriſie*, or *Peripneumony*, and afterward with a *Putrid*, and *Intermitting Fever*, and then the *Cough* encreaſes, and vaſt quantities of Matter is expectorated, ſometimes ſweet, and ſometimes fætid, with Night Sweats, Diarrhœa's, ſwell'd Legs, ſore Mouths, Pain in the Throat upon ſwallowing any thing, and at laſt the *Facies Hippocratica*, which terminates in Death.

§ 3. When any Evacuation is ſuppreſſed, whether it be the *Menſes*, the *Hemorrhoids*, *Urine*, or the matter of *inſenſible Perſpiration*, &c. 'twill neceſſarily induce a *Plethora*, which if it cauſe not a Fever, as it often doth, will by its greater weight upon the Veſſels it circulates through, ſo *relax* 'em, as to render them leſs fit to carry on the circulation; upon which account the Blood will not only paſs through the Capillary Arteries more difficultly, but be apt

to

to depoſit a *Slimy Mucus* upon any part that is diſpoſed to receive it. This greater quantity of Blood, by diſtending the *Arteries* of the *Brain*, will in ſome meaſure intercept the Motion of the Spirits through the Nerves, and the greater Viſcidity of the Blood, together with its diminiſhed Celerity, will leſſen the quantity of Spirits ſeparated in the Brain, (by the 20th. and 22d. Propoſitions of *Animal Secretion*) therefore the force of all the *Muſcles* in the Body, and conſequently of theſe ſerving *Reſpiration*, will be leſſened. Now that this greater quantity of Blood, which is alſo more Viſcid, may paſs with eaſe thro' the *Lungs*, 'tis neceſſary that the *Lungs* ſhou'd be more Inflated, than at another time: But on the contrary, in the preſent circumſtances, they will be leſs; for their Inflation depending on the quantity of *Air* admitted into 'em, and that quantity depending on the greater or leſs enlargment of the Cavity of the *Thorax*, and this upon the force of the *Muſcles* ſerving *Inſpiration*, which is prov'd to be leſs in this Caſe; therefore the Blood will be apt either to ſtagnate in the *Lungs*, and ſo cauſe *Inflammations* which may end in *Ulcers*, or leave

behind it a ſlimy Matter, which will cauſe *Tubercles* in the *Lungs*, whereby the *Patient* will be enclined to *Cough*, but not violently, becauſe the *Tubercles* are not very troubleſome; and there will be a Senſe of weight in the Breaſt, and a difficulty of Breathing, eſpecially upon quick Motion; for the ſame reaſon, the irritation to Cough will be greater, and the difficulty of Breathing encreaſed, by any thing that leſſens the Cavity of the Breaſt, as a full Stomach will do, by hindering the *Diaphragm* from ſinking in *Inſpiration*; therefore upon *Eating*, the Patient *Coughs* till he *Vomit*, and ſo eaſes himſelf of the Burthen.

§ 4. If the *Tubercles* be only on one ſide of the *Lungs*, the weight is perceiv'd there, and the Patient Coughs more for lying on one ſide, than the other: The Blood being in this Viſcid State, its Motion impair'd, and the Coats of the *Glands* relax'd, will encreaſe the quantity of Viſcid Secretions above the Fluid, and alſo the Viſcidity of the ſecern'd Matter, (by the 15, 20, and 22d Propoſitions of Secretion) therefore the *Glands* of the *Stomach*, the *Aſperia Arteria*, and thoſe which empty their Contents into the Mouth, will

ſeparate

separate a Matter more *Viscid* than ordinary, and also in greater quantity; from whence we may account for the loss of Appetite, Thirst, and foulness of the Tongue, and Hoarseness we observe in this Distemper; the Viscidity of the Blood encreasing, and the quantity of *Animal Spirits* decreasing, the Orifices of the *Glands* will be mightily enlarg'd, and so a *Hectic Fever* will ensue (by Dr. *Cheyne*'s Theory of that Distemper) and consequently the *Patient* will be Thirsty, lose his Appetite, make reddish Urine, have a quick Pulse, red Cheeks after Meat, heat of the Palms of the Hand, Soles of the Feet, and *Hypochondres*, with a loss of the Muscular Flesh.

§ 5. Now if the *Patient* in these Circumstances be left to the Tyranny of this Distemper, without any *Medical Assistance*, or be treated after such a manner as to encrease the Cause of his Distemper, (as he generally is, with *Pectorals* and *Balsamicks*, which is the reason so few are recover'd from this Disease;) the Symptoms taken notice of in the last *Stadium*, or in a confirm'd Consumption, will immediatly succeed: As a *new Fever* of the *Inflammatory kind*, &c. for the *Laxity* of the Solid parts

encreasing, as also the Viscidity of all the circulating Liquors, the *Tubercula* in the *Lungs* will grow larger every Day than other; the heat also encreasing, will dispose these *Tubercula* to Inflame, and Suppurate, which will occasion *Pleurisies*, *Inflammation* of the *Lungs*, and at last *Putrid* and *Intermitting Fevers*, when the Impostumation breaks. From this *Ulcer* in the Lungs will great quantities of either sweet or fætid Matter, be expectorated by Coughing, and the Viscidity of the Blood being greater, and the Coats of the *Glands* being also more relaxed, a greater quantity of concocted *Phlegm* will be separated (in those *Glands*, which empty their Contents into the Mouth,) either by *Hawking* or *Coughing* (by the forementiond Propositions of Secretion,) so that the Cough will grow worse, and the *Patient* will Spit more: And he will also be troubled with Night Sweats, for the Pores of the Skin being mightily enlarg'd, and more so in Sleep, than when Waking, and the Bloods Motion being accelerated by the heat of the Bed; upon both these Accounts, Sweat will be forc'd, and if by any means this evacuation be suppress'd, some other will be

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encreas'd, which is generally that by the *Glands* of the *Inteſtines*, they being ſo much relax'd, and their Orifices ſo much enlarg'd, for which reaſon a *Diarrhœa*, and *Night Sweats*, do alternately waſt the Patient's Strength; but if both theſe Evacuations be ſuppreſs'd, the detain'd Matter will fall upon theſe Parts where its Motion is ſloweſt, and the reſiſtance to its preſſure is the leaſt; now the *Legs* being at the greateſt diſtance, both from the Heart, and Brain, and in the Day time in a depending Poſture, the Motion of the Blood will be there the ſloweſt, and the Tenſity of the Fibres the weakeſt: Whereas a ſufficient degree of *Tenſity* is requir'd to reſiſt the diſtending Force of the circulating *Humors*; therefore the *Legs* will Swell, when theſe Evacuations are ſuppreſs'd. The Coats of the *Glands* being yet more relax'd, will not be able to preſs out their Contents, whereby *Tumors* and ſometimes ſlight *Ulcerations* will ſucceed, ſo that the Mouth will be Sore, and the Throat pain'd upon Swallowing.

§ 6. I've now, as briefly as I cou'd, accounted for the Production of a *Conſumption*, by the ſuppreſſion of ſome natu-

natural Evacuation, and could as eaſily ſhew how 'tis brought about by the reſt of the *Procatartick* Cauſes aſſign'd; but this wou'd run me quite beyond my Deſign, and perhaps I may find a fitter opportunity of doing it, being furniſh'd with a good *Stock* of *Obſervations* of Cures perform'd in this Diſtemper, by a Method and Medicines vaſtly different from what is commonly practic'd and preſcrib'd.

§ 7. I ſhall only now examin how well the preſent Practice, by *Pectorals* and *Balſamicks*, anſwer the Indications taken from the preceeding *Theory*: The Indications are principally to render the *Humors* more *Fluid*, the *Fibres* more *Tenſe*, and to *evacuate* the *Viſcid Phlegm*, with which the *Glands* of the Stomach and thoſe about the Mouth are ſtuff'd, leſt by a longer ſtay the Glands be ſtill further relax'd.

The common *Diſpenſatory Pectorals* are the *Decoct. Pectorale*, *Syr. Botryos*, *Capil. Veneris*, *Glyceriz*, *Hyſop*, *Scabioſæ*, *Mel. & Oximel Scilliticum*, *Succus Glycerizæ*, *Lohoc de Caulibus*, *Farfar*, *Papaveræ*, *Paſſul. Pino*, *Portulac. Sanans*, *Diacod. Spec. Diatragacant. Frigid. Pulv*, *Haly*; and the moſt famous Simples are *Sugar*, *Hony* and *Li-*

Liquorice. Now all these, except the *Mel. Oximel Scillit.* and *Syr. Scabiosæ* (which are all Vomits) are *sweet*, *slimy Mucilages*, and are therefore directly contrary to the *Indications* in this *Distemper*; for they will both *Relax* the *Solid* Parts, and thicken the *Fluid*, they will fill the *Stomach* with a glutinous Slime, which will mightily *pall* the *Appetite*, and weaken *Digestion*, and they will also encrease the Thirst: Whereas the *Medicines* proper in this Case, shou'd *contract* the Solid Parts, *attenuate* the Fluid, and *evacuate* at due Intervals, the *Viscid Matter* lodg'd in the *Glands*; therefore gentle *Emetics*, mild *Stomacics*, moderate *Exercise*, especially by *Riding*, according to Dr. *Sydenham*'s Observation, a clear dry *Air*, the use of the *Cold Bath*, provided the Patient stay but a little time in at once, and the Distemper not far advanc'd, *Blistring Plaisters* frequently apply'd, with a Diet of *easie Digestion*, will best answer our expectation in the *Cure* of a beginning *Consumption*: But when the Disease is arriv'd at its last *Stadium*, nothing but Death is to be expected: The best that a *Physician* can do in this Case, is only to mitigate the Symptoms in order to make the remains

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of Life more comfortable. Yet 'tis not easie even in this *Stadium* of the Distemper to make certain and infallible *Prognostics*: I've more than once been deceiv'd in the recovery of a Patient, whose Symptoms gave not the least encouragement to expect it. The first Case was of a *Baker*, (and *Bakers* according to (*g*) *Ramazini*'s Observation, are subject to this Distemper, which thing I've also my self observ'd) who had been troubled with a *Cough* for above Twelve Months, which gradually encreased, till he was in the following Condition. When I first visited him, his Stomach was lost, his Thirst very great, his *Urine* red, and let fall a *Lateritious* Sediment, his Tongue foul, Sweat prodigiously every Night, Cough'd almost continually, and expectorated vast quantities of concocted *Pus* with streaks of Blood in it, which often smell'd abominably: His Flesh was gone, and by reason of Weakness was scarce able to rise from his Bed: In this deplorable Condition, at his earnest desire, I ordered such things as I thought most fit

(*g*) De Morbis Artificum, *p.* 184.

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to mitigate the Symptoms, without giving him the least hopes of a recovery; but contrary to my Expectations, the next time I saw him, which was about a week after, he was much better, and by a strict observance of Directions, in a Months time was fit for Drinking the *Chalybeat Waters*, which I order'd him, and thereupon he recover'd without relapse. The Medicines that recover'd him were such as were indicated by the foregoing *Theory*. And as for *Balsamics*, they are useful in this Distemper, in as much as they are *Stomachics*, or *Diuretics*, in which Vertues they may easily be improv'd by *Acid* or *Saline* mixtures; for by themselves, if taken in considerable quantities, they generally both *pall* the Stomach, and *heat* the Blood, and so rather promote than abate the *Symptoms* of this Distemper: But for the ends for which they are usually prescrib'd, they are altogether improper; for were they immediately apply'd to the Ulcerated part, they wou'd be of little advantage; for the same reason they are discarded the Practice of *Chyrurgery*, by the most Skilful in that Art: But so far are they from being immediately apply'd to the part affected, that but little of them enter the

the Maſs of Blood, and that very much alter'd from what they were when taken in at the Mouth. All *Balſams* whatſoever are much more *Viſcid* than the Matter ſeparated in any of the *Glands*, and the *Viſcidity* of the ſeparated Matter being as the number of *Plications* in the complicated Artery *(by the 2d Corol. of the 9th Propoſition of Secretion)* therefore to ſeparate a Liquor more Viſcid, than what is ſeparated in any other of the Glands, as *Balſams* are, the *Inteſtines*, which anſwer to the Artery, ought to be more complicated, than any Artery of which a Gland is compos'd; whereas the *Teſticulus Humanus* is 50 times more complicated than the *Inteſtines*; for the *Plications* of the Inteſtines are not above 96, as *(k)* Dr. *Cheyne* hath obſerv'd; and thoſe of the *Teſticulus Humanus* are 4800, for *(l) Bellini* tells us, the length of the complicated Artery of the *Teſticulus Humanus* is 300 Ells, and the Altitude $\frac{1}{16}$ Ell; therefore the number of *Plications* muſt be 4800. Now as 96. 4800. 1. 50. therefore if *Balſams* were only of equal Viſ-

(k) New Theory of Fevers, p. 50.
(l) De motu Cordis, Pro. 40.

cidity

cidity with the Matter ſeparated in the *Teſticles*, the *Guts* in order to ſeparate them into the *Lacteals*, muſt be either 50 times longer, that they might be 50 times more complicated, or the *Balſams* muſt be made 50 times more Fluid, and hereby loſe all the Properties of *Balſam*. So that *Balſamicks*, as ſuch, can never come at the Part affected, and therfore never heal it.

Some will be apt to imagin from what I've ſaid, that I aſſign too ſmall Diameters to thoſe Particles of *Chyle* which enter the *Lacteals*, whereas they are no ſmaller than what's neceſſary for the preſervation of our Lives and Healths; for was any Particle of indiſolvable ſolid Mattter, ſuch as *Stones*, or *Minerals* (both which are us'd in Medicine) to enter the *Lacteals*, and if the Diameter of ſuch Particles was greater than the Diameter of the ſmalleſt Veſſels in a Humane Body, they would obſtruct 'em, and cauſe *Inflammations*, *Gangrenes*, and *Death* at laſt. Now *Leeuwenhoek* with his *Microſcopes*, hath diſcovered Veſſels in a Humane Body, whoſe Diameters are 79200 times leſs than an Inch, and ſo ſmall at leaſt ought the Diameters of the *Lacteals* to be.

Cor.

Cor. 1. Hence we may see how necessary 'tis, that all hard, solid Medicines, (such as *Steel* and *Testacious Powders*) shou'd be finely Levigated, if we expect any advantage from them in the Blood.

Cor. 2. That these Medicines, as they are commonly prepar'd, only exert their force in the *Primæ Viæ*, and are of no use to correct the suppos'd *Luxuriant Acids* in the Blood.

CHAP.

CHAP. IV.

Of a Dropſie.

A *Dropſie* is a watry Swelling, either of the whole Body, or part of it. 'Tis divided into two Speceies, *viz.* the *Anaſæara*, and *Aſcites*. In the firſt, the Tumor is moſt in the Legs, and receives the Impreſſion of the Finger, but the *Pit* remains not ſo long as in a *Leuco-phlegmacy*: The *Urnie* is ſometimes pale and plentiful, the Patient hath no Thirſt, tho' he loſe his Appetite. In the *Aſcites* the Tumor is in the Legs, Thighs, Belly, and *Scrotum*, the *Water* is forc'd ſometimes into the Cavity of the *Abdomen*, and at other times into Veſſels it forms it ſelf, either from ſome dilated Membrane, or obſtructed *Lympheduct:* The Water is of various Colours; 'tis Salt, *Lixivious*, a little Corroſive, and Frothy, when mix'd with common Water: The *Urine* is red, lets fall a red Sediment, and little in quantity: The *Thirſt* is exceſſive, and the *Appetite* very little.

The *Antecedent* Cauſes are much the ſame with thoſe of a *Conſumption*, excepting ſuch, as more eſpecially reſpect the *Lungs*, which is the reaſon that determins the preceeding Diſorder to a *Conſumption*, rather than a *Dropſie*; for whatever preceeds either a *Conſumption*, or *Dropſie*, diſpoſes the Humors to be viſcid, and the Fibres lax: The laxity of the Fibres in a *Dropſie*, is both greater and more univerſal than in a *Conſumption*, and the motion of the Blood ſo ſlow, that *Perſpiration* is almoſt intirely ſuppreſs'd, ſo that a load of *Serum* will be thrown on ſuch parts as are fitteſt to receive it: And theſe are ſuch as are *depending* and moſt lax, ſuch as the *Legs*, *Thighs*, and *Viſcera*. The *Aſcites* ſeldom happens without ſome fault in the *Kidnies*, or a preceding *Jaundice*, Tumor in the *Liver*, or ſome other of the *Viſcera*, whereby the *Lymphatick Veſſels* are either mightily diſtended or broken: But the *Jaundice* and theſe Tumors may eaſily be produc'd by lax Fibres, and viſcid Blood. (*m*) *Doleus*, and (*n*) Dr. *Leigh* have both obſerved the *Omentum*

(*m*) Encyclopedia Medicinæ, &c. p. 364.
(*n*) Exercitatio de Hydrope.

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in Dropſies either full of Tumors, or elſe putrify'd; and 'tis from this Obſervation among ſome others, that *Doleus* ſuppoſes a paſſage from the *Stomach* to the *Bladder:* But theſe *Tumors* may as well be the effect, as cauſe of the Diſtemper; for even the *Jaundice*, Tumors in the *Liver*, *Spleen*, *Pancreas*, *Meſentery*, *Omentum*, &c. may (by ſuch a ſtate of the Solids, and Fluids, as Iv'e aſſign'd) be produc'd, as I have obſerved before. As the Viſcidity of the Blood daily increaſes in *Conſumptions*, for the reaſon aſſign'd in the preceding Chapter: So in this Caſe the Blood grows every Day more Watery; for the laxity of the Fibres being ſo very great, and the Motion of the Blood ſo ſlow, the complicated Arteries of which the Glands are compos'd, cannot be ſufficiently *Diſtracted*, and therefore will ſeparate very little from the Maſs of Blood: So that the quantity of *Serum* will continually increaſe, and the motion of the Blood being ſo ſlow, the Fibrous Parts will retire into the middle of the Canals, in which it moves, even as it doth, when taken into a Porringer, and force the *Serum* againſt the ſides of the Veſſels, till the preſſure become ſuch

as to drive the *Serum* thro' the Pores of the Veſſels, and lodge it in their *Interſtices:* Or elſe ſo dilate ſome of 'em as to form *Veſicles* to contain it.

From theſe ſhort Hints I've given about this Diſtemper, 'tis evident that the Cure of a beginning *Dropſie*, is to be attempted by ſuch means as ſtrengthen the *relax'd Fibres*, render the Humors more Fluid, encreaſe the Celerity of the Bloods Motion, and promote ſome or all the *Secretions* of which that of *Urine* and *Perſpiration* are the beſt adapted to anſwer our Expectation: But in moſt *Hydropic* Caſes, 'tis very difficult to encreaſe any of the *Secretions*, and eſpecially that of *Urine*. When the *Prima Viæ* are obſtructed, *Urine* is better promoted by gentle *Purges* than *Diuretics*, and I have found that preparations of *Tartar* beſt anſwer this end; and that when the *Stomach* and *Guts* are well cleanſed, an *Infuſion* of *green Tea* in *Rheniſh Wine*, is not only a good *Diuretic* and *Stomachic*, but encreaſes the Celerity of the Bloods Motion, and at the ſame time abates the Thirſt, whereas all other *Bitters* I've yet try'd, encreaſe it.

Dry Food, *Diuretics*, *Diet-Drinks*, *Exerciſe*, tho' never ſo violent, provided it wea-

weary not the Patient too much, a *dry Air*, the *Cold Bath*, and *Pleasant Company*, are of a greater necessity in the Cure of this Distemper, than any sort of Medicines without 'em.

Dr. *Willis* tells us of some cured of an *Anasacra*, only by removing their Habitation from a Foggy to a Dry Air; and I question not but that several Distempers may be as *safely*, and *pleasantly*, tho' not so speedily cured, by a regular use of the *Non-Naturals*, as by any means whatsoever.

CHAP. I.

Of Acute Diſtempers and in particular of a Fever.

§ 1. *Acute Diſtempers*, whether they be *Fevers*, *Pleuriſies*, *Rheumatiſms*, *Collicks*, &c. eſpecially thoſe attended with *Pain*, generally proceed either from a too great *Contraction* of the Solid Parts, too *Violent Motion* in the Fluid Parts, or both theſe together.

§ 2. Dr. *Cheyne*, in his *New Theory of Fevers*, hath prov'd at large, that the general Cauſe of *Acute Fevers*, is an *Obſtruction* or *Contraction* of the *Glands*, whereby the quantity of Blood, and *Liquidum Nervorum*, is encreas'd; from whence all the Symptoms of *Fevers* may be accounted for.

§ 3. If the *Pain* be great, eſpecially in *Membranouſe* Parts, it will either cauſe or encreaſe a *Fever*, for it is always attended with a *Contraction* of the pained Part, (as is evident from the

(*o*) *Bel-*

(*o*) *Bellinian Doctrine de Stimulis*) and by this *Contraction*, the Motion of the Blood and Spirits is either totally obſtructed or retarded, and the part ſwelled, and by their preſſure againſt the ſides of the containing Veſſel, more forcibly, as they will, when their direct Motion is hindred, the Pain is both encreaſed, and propagated further, and the *Contraction* is more or leſs communicated to all the Parts of the Body, whereby *Secretions* are ſtopped, and the quantity of Blood encreaſed, which will either cauſe or encreaſe a *Fever*. Beſides Pain, which is a *Stimulus*, makes more denſe and ſtrong Vibrations of the Solid Parts, and ſo divides the Blood into ſmaller Parts, which muſt therefore take up more room; for the *Surfaces* of Bodies, upon their diviſion, do not decreaſe ſo faſt as their *Solidities*, theſe being in a *Triplicate*, as thoſe are in a *Duplicate Proportion*, to their Diameters: So that the more Bodies are divided, the more ſenſible ſpace they fill: And this is all one, as if the Magnitude of the Particles had continued the ſame, and the quantity been encreaſed, ſee-

(*o*) Bel. de Urin. & Pulſibus, *p.* 165.

ing all the effects of an encreaſed quantity are hereby produced.

§ 4. This greater *Fluxility* of the Blood will ſupply a greater quantity of *Animal Spirits*, as is known to any who underſtand the nature of *Secretion*, and being that a *Fever is but the encreaſed Circulation of the Blood*, and the *Velocity* of the Bloods Motion being in compound proportion of the frequency and ſtrength of the Hearts Contraction directly, and the *Reſiſtance* it meets with reciprocally, and theſe depending upon the quantity of *Animal Spirits* ſerving for the Contraction of the Heart; and the *Reſiſtance* being leſs, from the greater *fluxility* of the Blood, therefore the greater *fluxility* of the Blood will cauſe, or encreaſe, a *Fever.*

§ 5. I ſhall now ſhew, how the moſt obvious *Symptoms* of a *Fever* are accounted for, from the too great *Velocity* of the Blood.

§ 6. The Pulſe in a *Fever* is ſtrong, or quick, or both; the Patient is hot, and dry and reſtleſs, he is thirſty, his Tongue is foul or dry, he is Watchful, then Deliræous, Convulſed, and the Pulſe is now weak and intermitting, and then the Patient falls into Cold Sweats, and dies.

§ 7. The

§ 7. The Blood cannot move more ſwiftly thro' the Arteries, unleſs the Heart contract more frequently, more ſtrongly, or both; now the dilatation of the Arteries, or the *Pulſe*, keeps time with the contraction of the Heart, and is more or leſs *Dilated*, as the Heart is more or leſs *Contracted*, therefore if the Celerity of the Blood be greater, the Pulſe muſt be *quicker*, or *ſtronger*, or both.

§ 8. The Blood moving more ſwiftly, every part of the Body will receive a greater ſhare of it, in the ſame ſpace of time, than it would have done, had it mov'd more ſlowly: The Blood being always hot, (be it from what cauſe ſoever it will) therefore every part of the Body receiving a greater quantity of Blood, will be ſenſible of a greater heat. And this Propoſition may ſo eaſily be demonſtrated, that I ſhall not ſtay upon it, *viz. That* (Cæteris paribus) *the Heat of an Animal is in compound proportion of his quantity of Blood, and the Celerity of its Motion.* There may ſeveral other Things contribute to the greater heat of the Patient: But this is certain, and evident from an encreaſed Celerity.

§ 9.

§ 9. This great heat will make him both *Dry*, by evaporating the thin Parts, and *Reſtleſs*, or which is all one, to change his Poſture frequently, in order to eaſe himſelf of the Torment he endures.

§ 10. This Heat will alſo act as an univerſal *Stimulus*, whereby all the Glands will be ſtraitned, and conſequently the ſecern'd Matter will be thinner or more fluid, and the remaining part of the Blood more ſolid, than in a natural State; therefore he will be *Dry* as well as *Hot*.

§ 11. The groſs parts of the Blood being retained in this condition, it is therefore more Viſcid; beſides its Viſcidity is encreas'd by its Heat, as is known by Experiment; for if you apply a much leſs degree of Heat than will boil Water, it will turn the *Serum* into *Gelly*. The Heat of the Blood is greater, in *Fevers*, than moſt imagin. The Heat of a Man's Skin, whoſe Pulſe beats ſixty Strokes in a Minute, is to the Heat of boiling Water, as 16 to 52, as appears by the *Thermometer*, ſo that boiling Water is but little more than three times as hot as the Blood of a Healthy Man. Now if the heat of the Blood ſhould in-

increaſe in proportion to the frequency of the Pulſe, (as it muſt if the Pulſe beat with the ſtrength it did, and generally it is ſtronger:) A Man then whoſe Pulſe beats 195 Strokes in a Minute, would be as hot as boiling Waer; and it is common for a *Feveriſh* Pulſe to beat a 120 Strokes in a Minute. Hence we may account for the *Syzineſs* of the Blood in *Pleuriſies*, and other *Inflammatory Diſtempers*, and ſo be reſcued from the dangerous Practice of thoſe, who, becauſe they obſerve themſelves, or have been told by others, that *Volatile Salts*, and *Spirits*, ſuch as *Hartſhorn*, *Sal Armoniac*, &c. will diſſolve the *Serum*, when coagulated by an *Acid*; therefore preſcribe theſe hot, ſtimulating Medicines, to the imminent hazard, if not deſtruction, of their Patients. And this they do, from a miſtaken *Hypotheſis*, that the *Syzyneſs* of the Blood, is owing to a *Coagulating Acid.* The contrary to which Dr. *Pitcarne* hath proved in one of his Diſſertations. *(p)*

§ 12. The Blood will then be made Viſcid upon ſeveral accounts; and from

(p) Diſſertatio de Opera quam preſtant Corpora, &c.

this

this Viſcid Blood will be ſeparated a leſs quantity of *Saliva*, and that more Slimy than in a natural State; the quantity of ſecerned Matter being in a reciprocal Proportion to the Viſcidity of the Blood, by the 17th. Propoſition about *Animal Secretion*: And alſo becauſe the greateſt quantity of *Saliva*, is ſeparated when the Blood moves the moſt ſlowly, as appears by making a Ligature upon the *Jugulars*. Hence both the foulneſs and dryneſs of the Tongue.

§ 13. The Orifices of the Glands being ſtraitned by the Stimulating Heat, the quantity of *Saliva* will ſtill be leſs; and the Heat ſpeedily evaporating the moſt Fluid Part of it, the whole Mouth muſt be exceeding dry; whence proceeds that unquenchable Thirſt, Perſons complain of in *Fevers*.

§ 14. This greater Velocity of the Blood, will ſend a greater quantity into the Brain, in a given time: And an encreaſed Velocity encreaſeth the Fluid Secretions more than the Viſcid, by the 20th. *Propoſition of Secretion.* The *Animal Spirits* being the fineſt of any ſecerned Matter, the *Exility* of their Parts rendring them inviſible. Therefore

fore upon both accounts an encreaſed Velocity of the Blood will encreaſe the quantity of *Animal Spirits*. Their quantity being greater, the *Nervous Tubes*, and all the Motory Fibres, will be fuller and more *Tenſe*, whereby *Senſation* will be ſtronger. Now ſince it is a neceſſary requiſite in *Sleep*, that the Fibres ſhould be *Relax'd*, and the *Animal* void of Senſation, and being neither of theſe can happen when the *Animal Spirits* are ſeparated in greater quantity, as they will be, when the Blood moves more ſwiftly; therefore the greater Velocity of the Blood will prevent Sleep, or the Patient will be watchful.

§ 15. And he will be alſo *Delirous*; for the Nerves being fuller of Liquor, its *Undulations* will be more *denſe* and *quick*, Senſation will be more lively, and leſs Impulſes upon the extremity of the Nerves will cauſe it. And the more lively any Impreſſion is, the greater attention the *Soul* beſtows upon it: Whether it be attended with Pain or Pleaſure; and ſo more regardleſs of former *Ideas*, being entirely imploy'd about the preſent Senſation. Now obſerve a Perſon in this condition, whoſe Senſes

ſes are ſo quick, that the moſt trivial Object will affect him: Suppoſe him ſo intent upon the preſent Objects, as to mind nothing elſe, and to ſpeak of what he obſerves, juſt as *Ideas* come into his Mind, without exerciſing his Judgment, in comparing them with former *Ideas* laid up in his Memory; his Talk muſt needs be incoherent, or in other Words yous will ſay, he is *Delirous*.

Befids this, the Blood having acquired a greater Solidity, by the Evaporation of its thin Parts, and its Celerity being ſo much encreaſed, the Strokes upon the extremity of the Nerves will be much ſtronger, whereby the *Reflux* of the *Nervous Fluid* to the Brain, will be as quick, as if the Motion of the Blood was ſlower, and the Nerves were ſtruck upon by *Effluvia* from External Objects; ſo that the ſame *Ideas* will be excited, as if thoſe Objects were really preſent; and the actions of Men being always ſuitable to the *Ideas* they have, there will be ſuch Actions as are produc'd by External Objects, when none ſuch are preſent; ſuch as thoſe conſequent upon *Joy*, *Fear*, *Anger*, *Revenge*, &c. In this caſe the By-ſtanders, will

con-

conclude they act Irrationally, or are *Delirious.*

§ 16. *Convulsions* are nothing but the *Involuntary* Contraction of the Muscles. The Muscles are contracted by an *Ebullition* of the Arterial Blood, and Animal Spirits. The Animal Spirits are derived into the Muscles, by the command of the *Will*, or by shaking of the Nervous *Tubes* through which they are convey'd. How the Nerves may be shaken, and that irregularly too, in the suppos'd Circumstances, is evident from the last Sect: But *Convulsions* from this Cause are generally strong, and happen not so often as the other I am about to account for, which is called *Twitching*, or a *Subsultus Tendinum*, and they are caused after this manner.

The Celerity of the Bloods Motion, and its Heat continuing, must at length render it so Viscid, that few, or none, of the Particles are small enough, to enter into the narrow Orifices of the Nerves; the supply of Spirits being hereby cut off, their quantity will continually decrease, till it be so small as not to keep the the *Antagonist* Muscles equally contracted. The entrance of more Spirits into that Muscle is not only prevented

vented, but the Spirits remaining in that Nerve, which terminated in the contracted Muſcle, are forced back, into that Place where there is the leaſt reſiſtance, and that is the *Antagoniſt* Muſcle, being now Relax'd, whereby that Muſcle is contracted, and the other relax'd, and ſo alternately; and ſince the quantity of Spirits is ſo ſmall, the Contraction of the Muſcles will be very weak, and the Convulſive Motion will be a ſort of *Trembling*, or *Twitching*.

The Influx alſo of the Spirits into the Nerves, by the Pulſation of the Arteries being alternate, ſo would their Efflux thro' the Emiſſary into the Muſcles, were it not for the fulneſs of the Nerves, whereby the Efflux becomes continual; therefore when the Nerves are much emptied, the Efflux will be ſenſibly alternate: Whereby the Muſcle will be alternately contracted, or there will be *Twitchings* of the *Tendons*.

§ 17. The Patient in this condition, hath a weak, and interrupted Pulſe, and in a Cold Sweat.

The Pulſe is weak, by the defect of Spirits to contract the Heart, and becauſe the Blood grows ſtill more Viſcid, by

by losing its Serum in Sweat, its motion through the Arteries must be slower; whereby the resistance to the contraction of the Heart will be greater. Therefore a greater quantity of Spirits must be derived into the Heart, to overcome this greater resistance, and so a longer time must be spent before the the Heart be contracted, or the interval between the two Pulsations of the Artery will be greater. But the resistance being overcome, and the contraction of the Heart being stronger, caused by a greater quantity of Spirits derived into the Heart in a longer time, the contraction will be quick as usual, till the encreased resistance put a new stop to it, or the Pulse will intermit.

§ 18. The deficiency of Spirits must needs relax all the Fibres, so that the Pores of the Skin will be exceeding wide, and therefore the Patient will *Sweat*; and because the motion of the Blood is so very slow, the heat of the Blood, and consequently of the Sweat, will be less than that of a healthy Person, for which reason he will judge it *Cold*.

§ 19. The Spirits still wasting, and the Viscidity of the Blood encreasing, at length they will be unable to con-

tract the Heart, and ſo the *circulation* of the *Blood* will *ceaſe*, or in other Words, the *Patient* will die.

§ 20. From hence we may conclude how fit they are to be truſted with the Patient's Life, who inſtead of *curbing* the too *impetuous Motion* of the Blood with *cooling Diluters*, and *moderate Evacuations*, do *ſpur* it on faſter, with their heating *Cordials* and *Alexipharmicks*.

Though I have not attempted to explain every *Phænomenon* in the Diſtempers I have mentioned, (for that would have run me quite beyond my preſent Deſign in this ſhort Eſſay) yet from what has been ſaid, may be drawn ſeveral Practical *Corollaries*, to direct us in a more rational Method than that which is too commonly, and every Body knows, but too *unſucceſsfully* Practic'd.

CHAP. VI.

Of the Air.

§ 1. THE *Air* which we continually breath, and which conſtantly environs us, muſt needs impart its benign, or baneful *Influences*, according to the various changes it undergoes, as to its *Gravity*, *Elaſticity*, *Moiſture*, *Dryneſs*, *Heat*, or *Coldneſs*; or as it has more or leſs foreign Particles, ſuch as *Mineral*, *Vegetable*, and *Animal*, floating in it.

The *Air* is a compreſſible and dilatable *Fluid*, covering the Earth and Sea to a conſiderable height, the lower parts being always more compreſs'd than thoſe above, and the ſpaces into which it may be compreſs'd are always reciprocally proportional to the compreſſing Weight; and becauſe its Denſity is proportional to its Compreſſion, its Particles do recede from each other, with forces reciprocally propor-

tional to the distances of their *Centers*, as Sir *Isaac Newton* hath demonstrated. (*q*)

§ 2. That the *Air* is really *heavy*, was first found out by *Galileus*, by trying to what height Water might be rais'd by Pumping; and when he found it could not be rais'd higher than thirty five Foot, concluded that it was from the *Counter-ballance* of the *Airs* Weight that it was rais'd so high, and not from an imaginary *Fuga Vacui*.

§ 3. The Specifick *Gravity* of *Air* to *Water*, according to Mr. *Boyle*'s Experiments, is as 1 to 1000, but comparing this with the Observations of Mr. *Halley* and Sir *Isaac Newton*, 'tis perhaps, nearer the Truth to assign the Density of *Air* to *Water*, as 1 to 800, and the Density of *Mercury* to *Water* being as 14 to 1, the Density of *Air* to *Mercury* will be as 1 to 11200; so that the *Air* we breath in, takes up 11200 times the space that the like quantity of *Mercury* would: And yet (*r*) Mr. *Boyle* hath found by Experiments, that the *Air*,

(*q*) Principia Philo. Mathem. *p.* 23. L. 2.
(*r*) *Tracts about the admirable Rarefaction of the Air.*

with

without any *adventitious* Heat, may, by the force of its own Spring, poſſeſs *thirteen Thouſand times* the ſpace it doth when preſſed by the incumbent *Atmoſphere*, and therefore may poſſeſs a ſpace *one hundred and forty five Millions and ſix hundred Thouſand times* greater than the ſame weight of *Mercury*, and by the addition of Heat it may be forced to fill a ſpace much larger. Now if we conſider that the *Air* we breath in may be compreſſed into 40 *times* leſs ſpace than that which now it fills, it may then poſſeſs a ſpace *five hundred and twenty thouſand times* greater at one time, than at another, for 13000 × 40 = 520000.

§ 4. This *Fluid* I have been deſcribing, is ſo neceſſary, that an Animal cannot live a few Moments without it, as is evident from Experiments of their ſudden Death in the *exhauſted Receiver*; *as* alſo for this reaſon, *that* ſo ſoon as the Blood ceaſeth to *circulate*, the Animal dies: And it cannot circulate thro' the Body, unleſs it paſs the *Lungs*, which it cannot do ſo long as they are unblown up. And it is only the *Air*, which, by its *Weight* and *Spring*, is able to dilate the *Trachea*, and puff up the little *Air*

Bladders, whereby the sides of the Blood-Vessels are drawn asunder, and room made for the passage of the Blood thro' the *Lungs*. And yet if the *Air* by its greater Gravity, or Spring, should distend the branches of the *Trachea*, and swell the *Air Bladders* above what is necessary to increase the Diameter of the Blood Vessels to their greatest length; it wou'd then, by taking up too much room, press the sides of the Blood Vessels together again, and so either retard or obstruct the motion of the Blood through the *Lungs*. I shall transcribe some Propositions *(ex iis, quæ in prima parte respirationis*, &c.) of *Bellini*'s in his Preface to his Book *de Urinis & Pulsibus*; &c. to confirm my own reasoning on this Head. ' *Propositio* 22. *Sanguis fluere per* ' *Pulmones debuit, nec potuit iis non in-* ' *flatis, potuit tamen per reliqua Viscera.*

' *P.* 23. *Ducto in pulmonem aere ejus* ' *momenti, quod ramis tracheæ ad obtusum* ' *angulum convertendis, inflandisq; folliculis sufficiat, non tamen tanti, quod per* ' *nimiam folliculorum extensionem iis advolutos canales sanguinis occludat, totus* ' *pulmo simul inflabitur, & sanguis per ipsum fluet.*

P. 24.

P. 24. ‘ *Sanguis nihil patitur ab Aere,*
‘ *cujuſcunq; momenti ſit, dum in pulmo-*
‘ *nem ducitur, neq; cum redditur, ſi mino-*
‘ *ris, aut majoris momenti fuerit: at vero*
‘ *cum expiratur aer momenti mediocris, tum*
‘ *ſanguis ab ipſo ſolvitur in minimas par-*
‘ *tes, & quidem ſub ipſum expirationis*
‘ *initium, nihil deinde patiens per totam*
‘ *reliquam expirationem.*

P. 25. ‘ *Aer æquo rarior, & æquo den-*
‘ *ſior non eſt idoneus reſpirationi. & uter-*
‘ *vis reſpiretur inter varias, & plures af-*
‘ *fectiones, brevi animal moritur.*

§ 5. Let us now conſider what happens upon the inflation of the *Lungs*.

There is hereby room made for the Blood to paſs through the *Lungs*, which it cou'd not do before; ſo that were the *Lungs* to continue in this inflated condition, there would be nothing to obſtruct the motion of the Blood through them, with whatſoever Celerity the contraction of the right Ventricle of the Heart wou'd propel it.

Now the *Air* cannot remain in the *Lungs* without being much heated, and thereby have its Spring *unbent*, and ſo become ſpecifically lighter than the external *Air*. For which reaſon it will, by a known Principle in *Mechanics*, give

place to it, and rise to such a height, as, till it meet with *Air* of its own weight, and there it will remain.

Supposing then the *Lungs* always blown up, yet there would be a constant supply of fresh *Air*, for all the purposes the *Air*, as such, can be useful.

Therefore they are mistaken, who think that Respiration (*viz.* an alternate inflation and sinking of the *Lungs*, together with a contraction and relaxation of the Muscles serving Respiration) is perform'd in an *Animal*, for the end the Blood may *circulate* thro' the *Lungs*; or that the *Air* may hereby blow up the flame of Life, or *ventilate* and cool the too hot Blood in its passage through the *Lungs*, or carry off the *fuliginous* Parts of the Blood; nor yet to impart its *Nitrous Salts* to dissolve the Blood, nor its *Elastic* Particles to communicate an *Oscillatory* Motion to the Blood: Some of these being generally suppos'd as the end of Respiration. For all these ends may be obtain'd, even whilst the *Lungs* remain inflated: Therefore *Nature*, which do's nothing in vain, never design'd Respiration for any of these ends, which may be accomplish'd as well without it.

§ 6.

§ 6. Now, since in fact there is such a thing as Respiration, let us observe what will happen, when by any means whatsoever, the *Air* is forc'd out of the *Lungs*.

§ 7. The sides of the Blood Vessels, which by the inflation of the *Lungs*, were drawn asunder, will now, the *Lungs* being crouded on a heap, be forc'd together, and so the Blood contain'd in them, broken, and divided into innumerable small Parts, and thereby render'd more fit to pass the several *Strainers* of the Body.

§ 8. From what hath been said, it follows, that *Air* either too *dense* or *rare*, (tho' it be not to such a degree as to become Mortal) as it is unfit for Respiration, so must necessarily be unhealthful, and consequently the highest Hills are unwholsome, as well as the lowest Vallies.

§ 9. And as the Blood upon this score must be less broke and divided, it will dispose to all those Distempers which proceed from a too great Viscidity therein.

But there is scarce any *Chronical Distemper* but which may either derive its Original from, or owe its growth to this Cause:

Cauſe: As the *Jaundice*, *Cachexy*, *Dropſie*, *Aſthma*, *Ague*, and the *Hypocondriacal Illneſs*; and there is no Diſtemper wherein the change of *Air* is more uſeful than in *Conſumptions*, ſometimes doing more than any Medicine whatſoever could perform without it.

§ 10. Our Bodies are equally preſs'd upon by the incumbent *Atmoſphere*, and the weight they ſuſtain is much greater than is commonly imagin'd, being equal to a *Cylinder* of *Air*, whoſe *Baſe* is equal to the *Superficies* of our Bodies. Now a *Cylinder* of *Air*, of the height of the *Atmoſphere*, is equal to a *Cylinder* of *Water* of the ſame *Baſe*, and 35 Foot high, as appears by *Gallileo*'s Experiment of Pumping: So that every ſquare Foot of the *Superficies* of our Bodies, is preſs'd upon by a weight of *Air* equal to 35 *Cubical* Feet of Water, and a *Cubical* Foot of Water being found by Experiment to weigh 76 Pound *Troy* Weight; therefore the compaſs of a Foot ſquare upon the *Superficies* of our Bodies, ſuſtains a quantity of *Air* equal to 2660 Pound weight, for $76 \times 35 = 2660$, and ſo many Foot ſquare as there is upon the *Superfices* of a Body, ſo many times 2660 Pounds Weight does that Body

Body bear. So that if the *Superfices* of a Man's Body was to contain 15 ſquare Feet, which is pretty near the Truth, he wou'd ſuſtain a Weight equal to 39900 Pounds *Troy*, for $2660 \times 15 = 39900$, which is above thirteen *Tun*.

§ 11. The difference of the Weight of the *Air* that our Bodies ſuſtain at one time more than at another, is alſo very great. The whole Weight of *Air* which preſſes upon our Bodies when the *Mercury* is higheſt in the *Barometer*, is, as I have already prov'd, equal to 39900 Pounds *Troy*. I ſhall now prove that the difference between the greateſt, and the leaſt preſſure of the *Air* upon our Bodies, is equal to 3982 Pounds *Troy*.

The difference of the *Airs* Weight at different times, is meaſured by the different height to which the *Mercury* is *buoyed* up in the *Barometer*, and the greateſt variation of the height of the *Mercury* being three Inches, a Column of *Air* of any aſſignable *Baſe* equal to the Weight of a *Cylinder* of *Mercury* of the ſame *Baſe*, and the Altitude of 3 Inches will be taken off from the preſſure upon a Body of an equal *Baſe*, at ſuch times as the *Mercury* is three Inches lower in the *Barometer*. So that every Inch

ſquare

ſquare of the Surface of our Bodies is preſs'd upon one time more than another, by a Weight of *Air* equal to the Weight of 3 *Cubical* Inches of *Mercury*. Now a *Cubical* Foot of Water being 76 Pounds, a *Cubical* Foot of *Mercury* muſt be 1064 Pounds equal to 102144 Drams. And as 102144 Drams is to a *Cubical* Foot, or which is all one, 1728 *Cubical* Inches :: $59\frac{1}{1728}$ Drams to one *Cubical* Inch. So that a *Cubical* Inch of *Mercury* (throwing away the Fraction which is inconſiderable) is equal to 59 Drams, and there being 144 ſquare Inches in a Foot ſquare, therefore a maſs of *Mercury* of a Foot ſquare *Baſe* = to 144 ſquare Inches, and 3 Inches high, muſt contain 432 *Cubical* Inches of *Mercury*, which being multiplied by 59 (the number of Drams in a *Cubical* Inch of *Mercury*) makes 25488 Drams, and this Weight does a Foot ſquare of the Surface of our Bodies ſuſtain at one time more than an other. Suppoſe again the *Superfices* of a Humane Body equal to 15 ſquare Feet, then wou'd the Body ſuſtain at one time more than another, a Weight $= 15 \times 25488 = \frac{382320 \text{ Drams}}{8}$ (= 47790 Ounces) = 3982½ Pound *Troy*.

12 § 12.

§ 12. Now it is so far from being a wonder that we sometimes suffer in our Health by a change of Weather, that 'tis the greatest, we don't always so; for when we consider that our Bodies are sometimes press'd upon by near a Tun and a half Weight more than at another, and that this variation is often very sudden; 'tis surprizing, that every such change shou'd not entirely break the frame of our Bodies to pieces, and be the constant harbinger of sudden Death. One wou'd think that when so many of the Vessels of our Bodies are straitned by an encreased pressure, that the Blood wou'd stagnate up to the very Heart, which not being able to contract it self, the circulation wou'd cease, and we shou'd die. But such is the contrivance of infinite Wisdom, that when the resistance to the circulating Blood is greatest, the *Impetus* by which the Heart contracts should be so too: The Weight of the *Air* encreasing, the *Lungs* will be more forcibly expanded, and hereby the Blood more intimately broken and divided, so that it becomes fitter for the most fluid Secretions, such as that of *Animal Spirits*, by which the Heart will be more strongly contracted. The

Bloods

Bloods motion towards the Surface of the Body being obſtructed, it will paſs in greater quantity to the *Brain*, where the preſſure of the *Air* is taken off by the *Cranium*: And upon this Score more Spirits will be ſeparated, whereby the Heart will be ſo ſtrongly contracted, as to carry on the *circulation* thro' the paſſable *Canals*, whilſt ſome other are obſtructed.

§ 13. There will be one conſiderable alteration made in the Blood, upon the *Airs* greater or leſs preſſure on the *Surface* of our Bodies, *viz.* the Blood will be more or leſs compact, will be crowded into a leſs or poſſeſs a greater ſpace in the Veſſels it runs in. For the *Air* contain'd in the Blood, always keeps its ſelf in *Æquilibrio* with the External Air that preſſes upon our Bodies; and this it does by a conſtant *Niſus* to unbend its ſelf, which is always proportional to the compreſſing Weight by which it is bent: So that if the Compreſſion or Weight of the *circum-ambient Air* be never ſo little abated, the *Air* contain'd within the Blood unfolds its Spring, and forces the Blood to take up a larger ſpace than it had before; for which reaſon the Blood will be *rarified* into twice its Dimenſions in the *exhauſted Receiver*;

and

and its only this way the Operation of *Cupping Glaſſes* can be explain'd.

§ 14. This alteration happens to *Vegetables*, and *Fermenting Liquors*, as well as to *Animals*. How conſiderable changes are made by Heat, Cold, or great Winds, in *Fermenting Liquors*, is the Obſervation of every Body converſant with them. Now all theſe changes are brought about, by altering, either the Gravity or Spring of the *Air*.

§ 15. And its for this reaſon that ſome People, by their *Pains*, can foretel any conſiderable change of the Seaſon, their Blood being more rarified againſt wet Weather, or high Winds, will more forcibly preſs the ſenſible Membranes whereby *Pains* will be felt, they were free from before.

And this will the rather happen, becauſe the Blood (how apparent the contrary may ſeem) will hereby become never a whit the more *Fluxil*; for *Froth* which is Water blown into Bubbles by *Air*, is leſs *Fluxil* than Water it ſelf; and the *Globules* of Blood being blown larger by the contain'd *Air* when the external Preſſure is remov'd, is render'd leſs Fluid, and will paſs the ſmall *Capillaries* with greater difficulty.

A Fluid must have its Parts small, smooth spherical or approaching thereto, and of equal Density, if the Fluid be *Homogeneal* by the 142 *Prop.* of *Borelli de Motibus a gravitate factis.* It is not necessary that the Parts should be in motion, as Mr. *Boyle* imagins, because 'tis neither apparent that the Parts of all Fluids are so, nor that the Parts of some Solid Bodies are not so. Therefore the Blood in this rarified Condition is rather less, than more, Fluxil, and this condition it will be in, whenever the *Airs* Weight is lessened, or its Spring weakned.

§ 16. There is no Liquor but what is something Viscid, that can be blown up into Bubbles, and the more tenacious the Parts of any Fluid are, the fitter it is for this purpose; the Bubbles will be both larger, and more durable. A mixture of Soap and Water may be blown into *Spheres* of above six Inches Diameter, and the Blood consists of Parts not unlike what is in such a mixture. The Blood hath Watry, Saline, and Oily Parts, as is evident to the Senses: But that which puts it beyond dispute that the Blood is blown into such little *Spherulæ* (and perhaps in

in the manner Dr. *Cheyne* (*s*) has assigned in his *Philosoph. Princip. of Natural Religion*) is what may be observ'd with a good *Microscope* in the Tail of a Fish. The *Globules* of Blood being too large to pass the smallest Arteries, change their *Spherical* Figure, for one that is *Spheroidal*, and recover their former figure again, when they come into a wider Channel. Now it is the property of an *Elastic* Body alone, that when its figure is chang'd, to recover it again: And nothing being *Elastic* but *Air*, or what contains *Air* in it, it's plain that those *Globules* must be filled with *Air*.

§ 17. From what hath been said, it appears, that whenever the Blood is too *Viscid*, so that the force of *Cohesion* be not greater than that by which the contain'd *Air* endeavours to expand it self, the Person will be more sensibly affected by change of Weather; and from hence may be taken better *Indications*, both for the Prevention and Cure of these Distempers, than from any other *Source* whatever.

(*s*) *P.* 217, 218, &c.

They who understand this *Theory*, will know for what reason, and in what circumstances, moderate *Evacuations*, *Exercise*, *Steel*, and *Mercury*, are so beneficial in this Case, and will never use one of them when another is more proper.

It would be the easiest part of my Undertaking to be particular in these Matters, but that it wou'd encrease the bulk of the Book to no purpose; for they, who understand not these short Hints, will be no better for a more distinct Explication.

§ 18. I shall now enquire how the Air affects us when 'tis too *Hot*, too *Cold*, too *Moist*, or *Dry*, &c.

There is none but who observe what considerable changes are made on the whole face of Nature, by the approach, or recess, of the Sun's warming and enlivening Influences; the Fields, the Forrests and the Gardens, put themselves in Mourning at his *Autumnal* departure.

Animals of several kinds retire to their Dens and Caves, to spin out an unactive Life in Sleep and Rest, till, by his Invigorating Warmth, in his *Vernal* Return, he thaws their congealed Juices,

ces, and excites them to an active Life.

§ 19. In the Spring we see the Plants peep out of the Earth, Flower and then Seed, the Trees Blossom, and Fructifie, the Birds Chirp and Sing for Joy of the approaching Summer: Whence is all this Life and Vigour, but from the motion and heat the Sun communicates?

The syzy Juices are rarified, and made to mount up the slender Tubes of Plants, and expand their Fibres, whereby Vegetation is perform'd; an artificial Heat will do the same in *Green-houses*, which shews the affinity between this and that of the Sun.

§ 20. So that *Heat* hath a Power of rarifying and putting in motion the Humors of our Bodies, and if moderate, of relaxing our Solid Parts, both which appears by the swelling and softness of our Skin and Veins when we are well warm'd by the Fire. On the contrary, when we are cold, our Veins are sunk, our Skin hard, rough, and contracted; but if the Heat be excessive, it will contract as much as cold. A little heat which only serves to drive the moisture out of a *Fiddle-string*, relaxes it; tho'

a greater heat ſhrivels it on a heap. Either *actual* or *potential Cauteries* do the ſame, applied to any part of our Bodies. Now as *Heat* affects us by rarifying our Humors, and relaxing our Fibres; ſo it leſſens the Spring of the *Air*, and therefore we don't only Perſpire more (according to (*t*) *Sanctorius*'s Obſervation) in Summer than Winter, but ſometimes more than is conſiſtent with Health and Strength, eſpecially if of a weak and lax Conſtitution. Therefore the *Cold Bath*, the uſe of a *Bruſh*, and moderate *Exerciſe* in the Morning and Evening, together with *Sub-acid* and *Sub-aſtringent* Food, is moſt proper for ſuch People.

§ 21. 'Tis not enough to know that Hot or Cold *Air* is the Parent of many Diſtempers, ſuch as *Fevers*, *Agues*, *Cholicks*, *Pleuriſies*, *Rheumatiſms*, *Catarrhs*, *Conſumptions*, &c. but alſo after what manner it operates to their Production; otherwiſe we are as much in the Dark as ever, as to their Cure. And this is only done by applying the known and obvious Properties of Cold,

(*t*) Medicina ſtatica, § 2. *Aphor.* 41.

and

and Heat, to the various alterations made in the Body, whence those Distempers are denominated.

§ 22. That the *Air*, when too *hot*, especially if moisture be join'd with it, disposes to malignant Fevers, is the common Opinion of Physicians, both Ancient and Modern, and the Method how *this*, as well as a great many other curious *Phænomena* in Nature are brought about, is clearly accounted for by a late Ingenuous Author (*u*). But if the Heat be excessive, tho' without moisture, it produces *Diary Fevers*, and sometimes those which the Ancients call'd *Putrid*: Perspiration being too great, the Humors must remain Viscid and Dry, and so unfit for circulation: The Fibres being relaxed also by the expence of Spirits, and the cold Evening succeeding, the perspirable Matter is then retain'd, whereby the heat is encreas'd, together with all other *Feverish* Symptoms.

§ 23. *Agues* are *Epidemical* in the *Fens* of *Cambridge-shire*, and the *Hundreds* of *Essex*, both of them flat, watery Coun-

(*u*) *Dr.* Mead's *Essays of Poisons*, p 161.

tries, which fill the *Air* with Vapours, whereby its *Elaſticity* is weakned, the Fibres of the Body relax'd, and the Pores of the Skin obſtructed.

Upon all theſe accounts the Blood will be apt to depoſite a ſlimy *Lentor* on the ſides of the Capillary Arteries, and the Orifices of the Glands, as is evident from what hath been ſaid already. But how this *Lentor* produces an *Ague*, will be too tedious to explain here; therefore I ſhall refer to what (*w*) *Bellini* hath writ on that Head; what he hath ſaid being ſo full, that there is little or nothing elſe to be added on that Subject. Now if coldneſs be added to the moiſture of the *Air*, it will ſo much the more certainly produce this Diſtemper; for Cold contracts, binds up, and makes the Blood more compact, ſo that its Motion becomes ſlower, and its Viſcidity greater; wherefore a cold and moiſt Conſtitution of the *Air*, beſides *Coughs*, *Diſtillations*, *Pleuriſies*, and *Rheumatick Pains*, uſhers in *Agues*, and ſome *Fevers* very near allied to them.

(*w*) De Febribus, *p.* 320, ad 401.

§ 24.

§ 24. We obſerve that *Hectic* and *Conſumptive* People are moſt in danger in very hot, or cold Weather: Heat relaxeth all the Veſſels of our Bodies, opens the Pores of the Skin, and encreaſeth Perſpiration, in which, conſiſts the eſſential nature of a *Hectic*, (as (*x*) Dr. *Cheyne* hath proved) and by weakning the Spring of the *Air*, diſpoſes the Blood to be more Viſcid and Dry, and ſo (by (*y*) *Bellini*'s Theory) will encreaſe that Diſtemper.

If the Seaſon be exceſſive Cold, the *Air's* Weight and Spring are both encreaſed, and the *Tone* of the *Lungs* being much weakned in a *Conſumption*, the *Air-Bladders* muſt be expanded above what is neceſſary, that the Blood may *circulate* through the *Lungs*; and then will it, in ſome meaſure, be obſtructed in its paſſage through them, and ſo produce all the *Symptoms* that are the conſequents of ſuch an obſtruction, as conſtant *tickling* to *Cough*, *Pleuriſies*, *Inflammation* of the *Lungs*, &c. And beſides this, the Cold by cloſing the Pores of the Skin, will hinder Perſpi-

(*x*) *New Theory of Fevers*, p. 129.
(*y*) Bel. de Urin. & Pulſibus, *p.* 320.

ration, and thereby encreaſe the quantity of Blood which will paſs the *Lungs* yet more difficultly, and for that reaſon will encreaſe the recited Symptoms. And it is upon this account alſo that the Patient falls into a *Diarrhœa*, the paſſage of the Serum through the *Cutaneous Glands* being ſtopp'd, it ſolicits thoſe of the *Inteſtines:* But if an entrance be refus'd here, the *Legs* ſwell, and *Aſthmatick* Symptoms encreaſe till the Patient die.

§ 25. Beſides the ſenſible qualities of *Heat* and *Cold*, *Moiſture* and *Dryneſs*, it is certain, from undoubted Experiments, that the *Air* is more or leſs ſtock'd with *Vegetable*, *Mineral*, and *Animal* Subſtances: Rain Water contains as much Vegetable Matter as Spring Water does, though not ſo much as River Water, according to (z) Dr. *Woodward*'s Obſervations on *Vegetation*. *Colcothar* will, by being expos'd to the *Air*, turn into a *Vitriol:* The *Caput Mortuum* of Sea-Salt, will, after being expos'd to the *Air* for ſome time, afford a conſiderable quantity of ſuch Spirits as were

(z) *Philoſoph. Tranſact.* No. 253.

diſtill'd

diſtill'd from it before; (as Mr. *Seignette* told (*a*) *Lemery*) what becomes of the Matter we daily Perſpire? certainly 'tis elevated into the *Air* we breath in, and when a dead Body corrupts, our Noſes will inform us of ſomething *exhaled* from it.

§ 26. And indeed it can't but be ſo, by the known *Laws of Nature*; for by what means ſoever a Body becomes divided, till ſome of its Particles become leſs than the compounding Particles of *Air*, (in a proportion greater than that by which the denſity of one of theſe Particles exceeds the denſity of a Particle of *Air*) they will be lighter, and ſo be elevated into the *Air*, until by their *Coalition* their Gravity be ſo much encreaſed, as to ſink them to the Earth again. And we need have recourſe to no other Cauſe for the Production of this admirable effect, even in the moſt hard and ſolid Bodies, than the *Rays* of the *Sun*. Mr. *Romer*, from his Obſervations on the *Eclypſes* of the *Satallites* of *Jupiter*, demonſtrates, that Light is not above ten Minutes in paſ-

(*a*) *Courſe of Chymiſtry*, p. 285.

ſing

sing from the Sun to the Earth. Now since the Earth is at least 10000 of its own Diameters distant from the Sun, therefore must the Light run 1000 of these Diameters in a Minute, which is above a hundred thousand Miles in a *Second*. And if a *Bullet* moving with the same Celerity with which it leaves the Muzzle of the *Cannon*, require 25 Years to pass from the Earth to the Sun, as *Hugens* has computed it, then will the velocity of Light, to that of a *Cannon Ball*, be as twenty five Years to ten Minutes, which is above a Million to one: So that the Particles of Light move above a Million of times swifter than a *Cannon Bullet*; and may we not expect proportionable effects from them, tho' they are so exceeding small? for the *Momentum* of any Body in motion against another, is as a *Rectangle* under the Magnitude and Celerity of the moved Body. We may guess at the effects of the *Rays* of Light separately, by what we observe when collected together in the *Focus* of a Burning-Glass: For no *Body*, tho' never so compact, is able to resist its force. *Gold* it self may be *Vitrify'd* by the concenter'd Rays of the Sun, though it be unalterable by any *culinary Fire*,

Fire whatever; as Mr. *Blondel* tells us, one part exhaling, whilſt the other is turned into Glaſs, and this in a few *Seconds* of time.

§ 27. Now from what hath been ſaid, it appears, that the Rays of the Sun are not only able to *abrade* and file off from the moſt ſolid Bodies, ſuch ſmall Particles, as being ſeparated, will become lighter than any the leaſt compounding Particles of Air, but alſo by the Celerity with which they will be reflected, be enabled to carry into the *Air*, ſuch little *Maſſes* of Matter as are really heavier than the *Air* they mount up in; which, when the force impreſſed (conſtantly decreaſing) becomes leſs than will impel them higher, they muſt neceſſarily fall down to the Earth again, and ſo muſt variouſly affect our Bodies, both in their Aſcent and Deſcent, according to their various Natures and Properties.

§ 28. The *moiſture* of the *Air* was very troubleſome and unwholſome to the firſt *Colonies* in *America*, till their prodigious Woods were in a great meaſure cut down, and their Land cultivated, whereby their *Air* became more *Serene*, and Dry. So that a woody Country muſt

muſt be unhealthful for ſuch as are of a *lax* Conſtitution.

The reaſon of this extraordinary moiſture in *Wood-land*, is eaſily accounted for, from (*b*) Dr. *Woodward*'s Obſervations on Vegetation, which are too tedious to incert here, I ſhall only take notice, 'That the Water in the Glaſs 'that had no Plant in it, continued the 'ſame quantity at the end of the Ex'periment, as at firſt, tho' a conſider'able quantity was expended, by riſing 'through the ſlender *Tubes* of ſuch 'Plants as were in the other Glaſſes, 'and that the largeſt thriving Plants 'expended the moſt Water, and that 'in ſome Plants the expence of the Wa'ter to the growth of the Plant, was 'as 700 to 1; there muſt then prodi'gious quantities of Moiſture exhale from the numerous Branches of large Trees, and when thoſe Trees are alſo numerous, muſt needs make the *Air Foggy*.

§ 39. The *Air* will not only be *Moiſt*, but partake ſomething of the nature of thoſe Plants thro' which the Moiſture exhales, and ſo may become more or

(*b*) *Philoſoph. Tranſact.* No. 253.

leſs

leſs wholſom on that account; for we know by Experience, that even fragrant Smells will ſo affect ſome *Hyſterical* Women as to throw them into a *Syncope*: And there is no Conſtitution which ſome Smell or other will not diſorder; and what a ſtrong Smell will do ſuddenly, a faint one may do in time. And tho' Cuſtom may abate the Senſe of it, as in *Tallow-Chandlers*, *Leather-Sellers*, and *Tanners*; yet by degrees it will operate effectually, to produce a change in the Conſtitution, either for the better, or the worſe, according to the different Subjects it hath to work on. And it is from offenſive Smells, among other things, that Diſtempers are more frequent and dangerous in *Cities* than the *Country*, and the great Mortality that is ſo often in *Camps*, is commonly owing to the ſame Cauſe; the Truth of this appears by the caution given to the *Jews*. (c) *Thou ſhalt have a place alſo without the camp, whither thou ſhalt go forth abroad, and thou ſhalt have a paddle upon thy weapon, and it ſhall be when thou wilt eaſe thy ſelf abroad, thou ſhalt dig therewith, and ſhalt turn the*

(c) *Deuteronomy*, c. 23. v. 12, 13.

back

back, and cover that which cometh from thee. It wou'd have been impoſſible for ſo numerous a *Hoſt* to have ſubſiſted ſo long, without all that care, we read of in the Hiſtory of their paſſage from *Egypt* to the *Holy Land.*

§ 30. The Diſtempers that rage moſt in *Camps*, are *Dyſenteries*, and *Malignant Fevers*, and though the Paſſions of the Mind, and bad Diet, have a great ſhare in producing them, as I may obſerve under their proper Heads, yet nothing contributes more to the production of ſuch Diſtempers than the *infected Air* they breath in, occaſion'd by that filth which is the neceſſary attendant of ſuch a Place, eſpecially in *Sieges*, where the corrupted Particles of dead Bodies, both of Men and Beaſts, fill the Air with an intolerable Stench; beſides, the *Steams* that are raiſed into the *Air*, from the Bodies of Men and other Animals, by Perſpiration, muſt ſo load the *Air*, as mightily to encreaſe its gravity, and the heat of the *Camp* will alſo weaken its *Spring*; upon both which accounts it will be unfit for Reſpiration, and thereby the Blood be *unbroken* in the *Lungs*, and ſo diſpoſe to thoſe Diſtempers that proceed from a Viſcid Blood: Such are *Agues*,

Agues, *Malignant Fevers*, and *Dyſenteries*, as is evident from the *Theory* of theſe Diſtempers.

§ 31. The *Air* upon the *Sea* being too *Salt* and *Moiſt*, cauſes Diſeaſes in *Seamen*, that we on the Land know little more of than the Name: Their Diet, which is principally Salt Meat, together with the Cold they are expos'd to, contribute their ſhare; but the *Air* which they conſtantly breath in, and which mixes it ſelf with whatever they Eat or Drink, and which is always contiguous to their Bodies, muſt needs be a Principal in all their Diſorders.

They are generally very *Coſtive*, and *(e) Ramazin* obſerves from *Bartholin*, that they require almoſt double the Doſe of Phyſick to *Purge* them that other People do.

The *Salt* in the *Air*, and alſo in their Meat, *ſhrivels* up the Fibres of their *Guts* and make them almoſt inſenſible; and being the expulſion of the *Fæces* is owing to the *Periſtaltick Motion* of the *Guts*, whatever abates that, as Salt Things will do, it will make the Man *Coſtive*,

(e) De Morbis Artificum, &c. p. 224.

and

and will alſo leſſen the force of a Purging Medicine. But the *Scurvy* is that Diſtemper they dread the moſt, and which few of them eſcape, and tho' there are ſo many odd Symptoms, as *red*, *blue*, or *black Spots* on the Legs, *extraordinary Weakneſs*, a *Redneſs* and *Itching*, *rotten Gums*, *ſtinking Breath*, *looſe Teeth*, *unequal Pulſe*, *violent Pains*, &c. yet they are all accountable for, from that alteration of the Blood which will be brought about by a *Salt* and *Moiſt Air*. From what I've ſaid above, it will render the Blood more Viſcid than in a natural State, and the *Salt* in the *Air*, and eſpecially the *Bittern* in that Salt which they eat, will heat and rarifie this Viſcid Blood, and ſo encreaſe its Celerity, and the *Globules* being greater will ſtay in the Capillaries till the force of the circulating Blood either break them, or remove the Obſtruction; from whence ariſes the *Spots* and *Itching* in the Skin, for *extravaſated* Blood turns *livid*, or *black*, ſome of the *extravaſated* Blood *putrifies*, ſo that the *Gums* rot, and the *Breath* ſtinks, *Pains*, irregular Pulſe, and the other Symptoms derive their Original from the ſame Source. That *Salt* is a principal Actor

in

in this *Trajedy*, is confirm'd by the Observation of (*e*) the aforemention'd Author, on those who work in making Salt. They are almost all *Cachectick*, *Hydropical*, with sordid Ulcers and Scabs upon their Legs, have voracious Appetites, are great Drinkers, and oft die suddenly.

§ 32. I might here take notice of the influences of the *Planets*, since they act only by altering the *Air*, as to its Gravity or Spring, or by raising *Effluvia* from the Earth, and by their Heat, which is always proportional to their Light, being both as the Squares of their Distances reciprocally, and as the Signs of the Angles of their Incidence. Those who think the *Planets* have no influence at all, need but to read Dr. *Mead*'s Book *de Imperio Solis & Lunæ*, &c. to be convinc'd of their Error; for he has from Sir *Isaac Newton*'s Principles, demonstrated the necessity of their influence upon Human Bodies, so that what heretofore was only Conjecture, is now a demonstrated Truth.

(*e*) Page 226.

§ 33. We may gueſs at the effects of *Mineral* Particles raiſed into the *Air*, either by the heat of the Sun, or a *Subterraneous* Fire, by the alterations that are made in the Bodies of thoſe who are moſt converſant with them. *Miners* in general are ſubject to *Aſthma's*, *Conſumptions*, *Apoplexies*, *Palſies*, *Cachexies*, *ſwell'd Legs*, *falling out of their Teeth*, *Ulcers of the Gums*, *Pains in the Joints*, and *tremblings:* In particular, *Lead* gives *Colicks* and *Palſies.*

Copperas, by its ſtipticity, being conſtantly applied to the *Aſpera Arteria* in Reſpiration, ſo contracts and ſtraitens the Veſſels, that the *Air* is not able to expand the *Lungs* to ſuch a degree, that the Blood may circulate freely, for which reaſon they who work upon it, are, according to common Obſervation, *Aſthmatick.*

§ 34. But of all others, the *Mercury Miners* are liable to the greateſt inconveniencies. * *Fallopius* tells us, that in four Months time they begin to tremble, and ſcarce any of them live three Years. They are ſubject to *Palſies*, *Vertigo*'s and

* Tract. de Metal. & Foſſilibus.

Hect-

Hectics, as appears from the Authority of a great number of Writers cited by *Ramazini*. (*t*)

In order to account for thoſe different effects of *Mercury* upon Human Bodies, I ſhall premiſe that it is capable of entring through the Pores of the Skin into the Maſs of Blood, as appears by thoſe who are *Salivated* by *Mercurial Unctions*; as alſo that *Miners* can change the colour of Gold from yellow to an obſcure white, by holding it, for ſome time, in their Mouths: Now *Mercury* being enter'd into the Maſs of Blood, of ſuch as work daily upon it, muſt wonderfully diſſolve and rarifie it; for it being about ten times as heavy as the Blood, every Particle of it will have ten times the force to diſſolve the Blood, that a Particle of Blood of the ſame Magnitude will have: For the *Momentum* of either a Particle of *Mercury* or Blood, to break thro' any Obſtacle, or overcome any Reſiſtance, is as a *Rectangle* under the Celerity with which it is moved, and the quantity of Matter contain'd in it, which is meaſur'd by its Weight.

(*t*) De Morbis, *Art. c.* 1, 2, 3, 4.

Now the Celerity being the ſame in both, the *Momentum* muſt be as their Gravities; and the Gravity of *Mercury* to that of Blood, being as ten to one, the *Momentum* of *Mercury* muſt be ten times as great as that of Blood. But if we conſider how much more ſwiftly the Blood moves in thoſe who have taken *Mercury* (the Pulſe being both quicker and ſtronger) as alſo the hardneſs and exility of the Parts of *Mercury*, by which they act as ſo many little *Wedges* in diſſolving the Blood and removing Obſtructions, we ſhall eaſily believe what Dr. *Cheyne* tells us. (*g*) That the Blood, aſſiſted by any conſiderable quantity of *Mercury*, will be able to do as much, in the removal of Obſtructions, in one Day, as the Blood unaſſiſted in three Years.

The Blood being in this rarified condition, will ſtretch the ſides of the Arteries beyond their uſual limits, and ſo the *Carotid* Arteries will preſs upon the *Optick Nerves*, and at every Pulſation of the Arteries, will ſhake the *Optick Nerves* and the ſeveral Branches of

(*g*) *New Theory of Fevers.* 122.

'em

'em dispers'd thro' the *Retina*, a little out of their Places; so that the same Object, tho' at rest, will every Moment paint its Image upon different parts of the *Retina*, and therefore seem to move upwards or downwards, to the right or left, or circularly, according to the various posture the *Retina* is put into; for 'tis the same thing to us, whether the Object move and the *Eye* be still, or the *Eye* move and the Object be at rest: We shall in both cases have the same Sensation, but in the latter we are said to be *Vertiginous*; so that 'tis no wonder that *Mercury-Miners* are subject to this Distemper.

This extension of the Arteries may be *such*, from a greater rarefaction of the Blood, as so to press and straiten the contiguous Nerves, that the passage of the Spirits thro' 'em to the Muscles, will be either wholly obstructed, or in part; so that there will be either a *Trembling Motion*, or none at all.

Besides this, a *Palsie* is sometimes caused by the hardness and driness of the Nerves, whereby their cavity is lessen'd, and the motion of the Spirits obstructed, and upon this account both Sense and Motion are taken away. From what

hath been ſaid, it appears that *Mercury* hath a wonderful efficacy in removing Obſtructions, making the Blood Fluxil, and ſcow'ring the Glands, whereby all Evacuations will be encreas'd, and the Body depriv'd of its moſt Fluid Parts, (*h*) (for in all Secretions the moſt Fluid Parts are firſt ſeparted) ſo that the Solid will become more dry than in a ſtate of Health, which was to be prov'd.

There is yet another reaſon why *Mercury* may, when receiv'd into the Body in too great a quantity, produce a *Palſie:* For if in any Artery there be ſo much *Mercury* amaſs'd together, that its weight be able to reſiſt the force of the circulating Blood, ſo that the *Muſcle* in which that Artery terminates, having its due ſupply of Blood cut off, will loſe its Motion. Any one may be ſatisfied of the Truth of this, by making a Ligature upon the deſcending Trunk of the great Artery of a Dog, for he will find him incapable of moving his hinder Parts. The ſame thing may happen in the Nerves, whereby

(*h*) *By the* 3*d Propoſition of* Animal Secretion.

the

the Spirits are obſtructed, ſo that we ſee, upon ſeveral Accounts, that *Mercury* may produce a *Palſie*.

But how it ſhou'd cauſe a *Hectic*, will not be ſo eaſily accounted for by thoſe who ſubſcribe to the common Theory. For *Mercury* is fitter to cure, than to cauſe, a *Hectic*, if owing to the cauſes generally aſſign'd. (*i*) *Etmuller* tells us, 'That the immediate Cauſe of a *Hectic*, 'is the indiſpoſition and unequal Tex- 'ture of the Blood, caus'd by the ſalt- 'iſh ſharpneſs of the Lympha in the 'Conglobate Glandules, and the Viſ- 'coſcity of that in the Conglomerate, 'from whence enſue a deprav'd and 'diminiſh'd Fermentation, Weakneſs, 'wearineſs and deficiency of Spirits, 'and the whole Train of *Hectic* Symp- 'toms; the Saline and Viſcid Blood is 'render'd unfit for nouriſhing the Parts, 'and after Eating, when the thin parts of 'the Chyle dilutes the Blood, and diſen- 'gages the Salts, the Pulſe is a little en- 'larg'd, and the Heat augmented, and 'after ſome time, ſink again to the or- 'dinary pitch; and the courſe Remains

(*i*) Oper. Medica. *cap.* de Febre Hectica.

'of the Chyle are frequently voided 'by Night-Sweats, as having receiv'd 'a vitious Tincture from the Saliva in 'the Stomach. What the Author means by an unequal Texture of Blood, will never be understood by those who know that the Texture of the Blood is never equal, even in a state of perfect Health, that is, its parts are never similar and of equal density; but could we conceive this unequal Texture of the Blood, and that which is still as difficult to understand, how the saltish Sharpness of the *Lympha* in the *Conglobate Glandules*, and the Viscocity of that in the *Conglomerate*, can be the cause of it, yet we know nothing fitter to blunt the edges of sharp Salts, and remove the Viscosity of any Fluid in the Body, than *Mercury*; and therefore instead of causing, shou'd cure a *Hectic*. So that we must either quit the common Theory, or deny that *Mercury* can cause a *Hectic*; but since the Fact is certain, let's try how we can account for it. From what hath been said before, it appears that *Mercury* will wonderfully enlarge th Orifices of all the Glands of the Body, and by spending the Spirits in excessive Perspiration, will make an universal relaxation of all the Fibres

Fibres in the Body, and the Diameter of Veſſels will be hereby enlarg'd, and the quantity of Blood mightily diminiſh'd, and the Strength greatly impair'd; for the Strength of an *Animal* is in triplicate proportion to the quantity of his Blood, *&c.* if the Reader underſtand but Dr. *Cheyne*'s *Theory of a Hectic*, he can't but clearly ſee how *Mercury* may be the cauſe of it.

§ 35. By thoſe few Inſtances we ſee what vaſt alterations may be made in the Conſtitution of an Animal, by the operation of *Mineral* Particles, when by any means admitted into the Maſs of Blood, as they will be more or leſs, in proportion to the number of them floating in the *Air*: So that a Phyſician can't better ſpend his time for the profit of his Patient, than ſtudy the Conſtitution of the *Air* in which he breaths, it being the Parent of ſo many Diſtempers. In *London* People are *Coſtive*, *Aſthmatic*, *Hyſteric*, and *Hypochondraic*, as alſo ſubject to Fevers of ſeveral kinds: The like I have obſerv'd at *Sheffield*, a great Manufactory for Knives and all other ſorts of Iron Ware; which occaſions the burning a prodigious number of

of Coals, which, by their Sulphureous Vapours, will neceſſarily diſpoſe to thoſe Diſeaſes.

And were we to conſider the various Conſtitutions of the *Air* in the ſeveral Seaſons of the Year, in imitation of the great *Hippocrates*, or that nice Obſerver, our own Country-Man, Dr. *Sydenham*, we ſhou'd be able to foretel future Diſtempers with ſuch exactneſs, as would raiſe the admiration of all that heard us, and might give occaſion to make uſe of ſuch things as are proper to prevent 'em, and ſo far aſſiſt us in diſcovering their nature, as mightily to facilitate their Cure.

(*k*) *Hippocrates* tells us, That the change of the Seaſons is the principal Parent of Diſeaſes, and no wonder that it ſhould be ſo, ſeeing the different Spring, Weight, Heat, Cold, Moiſture, *&c.* of the *Air*, are able to make ſo great alterations in a Humane Body, as I have fully proved they are. I had thought here to have *Commented* upon ſeveral of *Hippocrates Aphoriſms*

(*k*) *Aphor.* 1. § 1.

in

in § 3. about the *Air*: But considering the vast difference of the Climate, where he lived, from ours, I concluded that many of his Observations would be useless to us, as I found, by examining, they were; therefore I rather chuse to give an Account of the various Constitutions of the *Air* in *London*, taken notice of by that Sagacious and Indefatigable Searcher into Natural *Phænomena*, Dr. *Thomas Sydenham*, for 14 Years together, *viz.* from the Year 1661, to the Year 1675.

An Abstract of Dr. Sydenham's *History of* Epidemick Constitutions *of the* Air.

§ 1. HE tells us, That from the Year 1661, to the Year 65, the *Depuratory* and *Intermitting* Fevers of all kinds, were *Epidemical*.

§ 2. In the *Depuratory* Fever, besides the common Symptoms of other Fevers, he observ'd that the sick Person is very Faint, Vomits, or enclines thereto, the Tongue is black and dry, there is a sudden prostration of Strength, the external Parts are dry, the Urine is thick or thin,

thin, each a ſign of Crudity; in the declenſion a *Diarrhœa* happens, (unleſs it be prevented in the beginning) which protracts the Diſeaſe, but of its own Nature, it terminates in 14 or 21 Days, with a gentle Sweat. Other Symptoms happen upon irregular Practice.

§ 3 He begins the Cure with *Phlebotomy* in *Plethorick* Conſtitutions, which he repeats or omits, and gives Cordials more liberally or ſparingly, and looſens or binds the Belly, as the greater or leſs commotion of the Blood indicates; after *Venæſection* (if it be neceſſary) if the Patient *Vomit*, or have a *Nauſea* at his Stomach, he preſcribes a Vomit, and an Opiat at Night after it, by which means a *Diarrhœa* is prevented; ſo certain is this, that if a *Diarrhœa* happen in the declenſion, you may be ſure there was either a *Nauſea* or Vomiting in the beginning, and no Vomit given: He adventures to Vomit them in any *Stadium* of the Diſtemper, if a preſent *Diarrhœa* and *Nauſea* indicate it.

In the *Autumn*, *Bleeding* and *Coolers* are not ſo ſafe, but a Vomit is neceſſary, after a laudable Sediment in the Urine, ſhews the Fever to have left the Patient, which commonly happens on the

the fourteenth Day, if Nature be not disturb'd by too cooling a Method; in which Case it falls out about the twenty first Day; a Purge is to be administred: Till then he is to lie in Bed. Sometimes, especially in Old Men, a Cough, with spitting much tough Matter, succeeds a Fever, which is cured by moderate drinking of generous Wines. *Opiats* ought not to be given till the end of the Fever, and after Purging, if possible.

§ 4. Here we have a most accurate History of this Fever, with all its distinguishing Characteristicks, and a method of Cure, establish'd upon a long *Series* of Experiments; and how rational it is, will, in part, appear, by what I have already said of Fevers, and be farther illustrated by what I am about to say. Faintness, prostration of Strength, dryness of the Tongue and Skin, are accounted for before: I shall now shew, that when the Blood is in too great an agitation, (which is all our Author means by Crudity,) the *Urine* will be clear and thin, or thick and muddy. Perspiration will be stop'd, the Skin being dry, and the saline Parts of the Blood which used to be evacuated that way,

way, will be retain'd among the *Serum*, which, together with the greater Heat, will ſtimulate the *Kidnies*, whereby they will be ſo contracted, as to let out nothing but the moſt thin part of the *Serum*. And ſo violent may the motion of the Blood be, as to break ſome of the ſolid Parts into ſuch ſmall Particles as will, with the *Serum*, paſs the *Kidnies*, (eſpecially if by any means their Fibres be in the leaſt weakned and relax'd) and after they are ſeparated from the Body, ſo obſtruct the Rays of Light from paſſing directly through the *Urine*, as will make it appear thick and turbid; and beſides this, the *Urine* will be leſs Fluxil upon the account of this mixture, for the Viſcidity of Liquors is owing to the quantity and figure of the Solids which ſwim in them, and the different degrees of *attraction* thoſe Solids have among themſelves.

§ 5. The reaſon why a *Diarrhœa* happens in the declenſion, when no Vomit hath been given in the beginning, and why a Vomit prevents it, is, becauſe a *ſtimulating* Matter lying in the Stomach for ſome time, as it cauſes *Nauſea*'s and Vomiting whilſt it remains there; ſo after it is protruded into the *Guts*, as it ſome-

ſometimes will be, will act its part there, and cauſe a Purging: But on the contrary, this Matter being evacuated by a timely Vomit, and the Stomach regaining its Tone again, is better enabl'd to perform its Office, whereby the generating of ſuch Matter is prevented. There are ſeveral other advantages accrue to the Patient by this means, as you may ſee in (*l*) Dr. *Cheyne*'s *New Theory of Fevers*, yet I have frequently obſerv'd the Patient much worſe upon taking a *Vomit*; for Vomiting is not always to be cured by a Vomit, but ſometimes by ſuch things as moiſten, ſoften and relax the too tenſe and irritated Fibres of the Stomach: Beſides there are ſome of ſo delicate Conſtitutions, as are not able to bear ſuch violent commotions without the greateſt hazard: Which therefore put me upon contriving another Method leſs obnoxious to thoſe inconveniences, and that at laſt I hit upon; for by a proper management of gentle cooling Purgatives, of which there are ſome very agreeable to the Stomach of ſuch as are in a Fever, all is done that is

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expected from a Vomit (except the effects of a violent Contraction of the Muscles of the *Abdomen* and *Diaphragma*) both with more ease and safety: *Vomiting* is more necessary in the *Autumn* than the *Spring*, according to our Author's Observation; for in that Season of the Year the Humors of our Bodies are more Viscid, and the Vessels in which they circulate more lax and yielding, upon both which accounts, Vomiting is more proper. And it is upon this account that *Bleeding*, and too cool a *Regimen*, is so dangerous in this Season.

Tho' I have been very short in my reasonings upon this Fever, yet I have exceeded my own Design, therefore resolve to be more brief upon the other.

§ 6. The *Intermitting Fevers* of this Constitution he reduces to *Vernal* and *Autumnal*; the *Vernal* generally begin in *February*, the *Autumnal* in *August*; the *Vernal* are *Quotidian*, or *Tertian*, and are short and wholsome, except they be protracted by unnecessary Bleeding or Purging.

The *Autumnal* are *Tertian* or *Quartan*, the first not so dangerous, often leaves them,

them about the Winter *Solſtice*, the other is more dangerous, which often produces the Scurvy, Inflammation of the Tonſils, hard Bellies, and the Dropſie; the Young ſometimes get quit of it in *December*, but oftentimes not till *March*, and if Bleeding and Purging have weakned 'em, then not till next *Autumn:* It's more dangerous to the Aged.

Thoſe who have had a *Quartan*, if they have it a ſecond time, it laſts not over two or three Paroxiſms.

The *Vernal* are to be left to Nature, for they never kill. He found Vomiting good before the Paroxiſms, and Sweating after them.

The *Autumnal* are more difficultly cured. If the Conſtitution be *Epidemical*, the Adult are ſeiz'd in *June*, if not in *Auguſt*, and the beginning of *September*, they rather remit than intermit, for the firſt Days.

§ 7. The Author thinks there is a great affinity between theſe Fevers and the *Depuratory*; for he obſerves, that ordinarily the *Depuration* of the Blood is perform'd in 336 Hours, and if we reckon five Hours and a half for a Paroxiſm, in intermitting Fevers, then ſo

many Fits as at five Hours and a half a piece, amounts to 336 Hours, will terminate the Diſtemper, if left to Nature, which is agreeable to Obſervation: And for this reaſon 'tis, that *Tertians* continue longer than *Quotidians*, and *Quartans* than theſe, being longeſt in running the circuit of three hundred thirty ſix Hours.

§ 8. I ſhall take no further notice of his Method of Cure, being every Body knows that the *Cortex*, rightly adminiſtred, is a *Specifick* in all kinds of intermitting Diſtempers; I ſay if rightly adminiſtred, becauſe I have known it often unſucceſsful when given by an unskilful Hand. In particular, a Tradesman in *Sheffield* who was worn almoſt to a *Skeleton* by a Quartan Ague he got in *Eſſex*, which he had labour'd under for a Year, when I was conſulted: Beſides a great many other Medicines, he had taken above half a Pound of the *Cortex* without any advantage; and finding his Stomach quite gone, and he conſtantly faint and chil; after I had Vomited him with *Vinum Benedictum*, I cured him by giving him only two Ounces of *Cortex*, with a good quantity of *Rad. Sepentar*, *Virginian.* added to it,

it, by which, both its heating Cordial, and diſſolving Properties, were encreaſed.

§ 9. The next Conſtitution begun in 65, for after a very cold Winter, and dry Froſt in the Spring, till the end of *March*, which then ended with a ſudden Thaw, in the Year 65, Multitudes died of *Pleuriſies*, *Quinſies*, *Inflammations* of the *Lungs*, and ſuch like Diſtempers; from which time a continual *Epidemical* Fever begun, worſe than the *Depuratory*, the Head-ach and Vomiting were more grievous, the *Diarrhœa* was encreas'd, not leſſened by a Vomit, and the Vomiting made worſe, the external Parts were dry, yet, after Bleeding, Sweat might eaſily be forc'd at any time of the Diſtemper, with ſome advantage, which could neither eaſily be done in the *Depuratory*, nor if it could, was it without danger, till the 14th Day. The Blood in this Fever is ſomewhat *Pleuritick* or Syzy.

§ 10. The Blood being made very ſuſceptible of Motion, and Spirituous, by the preceeding Froſty Dry Weather, and the Fibres of the Body being relaxed, and the Pores obſtructed by the ſudden Thaw, do certainly diſpoſe to the Di-

ſtempers above recited: The Truth of this is deducible from what I have ſaid in ſeveral parts of this Book, ſo ſhall not trouble the Reader with my Reaſons here. Vomiting is improper in this Fever, for the ſame cauſe I have rejected it in the *Depuratory*, the Inflammation being greater, and the motion of the Blood ſwifter, the Tenſity of the Fibres are ſuch, as not to bear the leaſt irritation, for which reaſon, Bleeding, and gentle Sudorificks, muſt be uſeful: But 'tis beſt for the ſame reaſon to force Sweat by Liquors actually hot, together with the weight of Bed-Cloaths, rather than by the *Alexipharmics* commonly preſcrib'd.

§ 11. After this began the *Peſt*, which encreaſed till the *Autumnal Equinox* in the Year *66*, when it deſtroyed about 8000 in a Week, from thence it abated till the Winter-Cold almoſt vanquiſh'd it: In the Spring it quite ceaſed. The former Fever remain'd (tho' not ſo Epidemical) till the beginning of the Year *67*.

§ 12. At which time the 3d Conſtitution begun with the *Small Pox*, which encreaſed till *Autumn*, and then were *Epidemical*, and from thence decreas'd till the

the next Spring, (*viz.*) 68, when they begun to rage violently, and continued till Frosty Weather next Winter, which abated them; then in the Spring 69, they appear'd again, tho' not so universally as before, and lessen'd, till *August* 69, when they gave place to an *Epidemical* Dysentery.

§ 13. A Fever which the Doctor calls *Febris Variolosa* begun when the small *Pox* begun, in 67, and ended with them in 69, it had all the Symptoms of the Small Pox, save those that attend the Eruption, Maturation, *&c.* of the *Pustules.* The Signs are a Pain on the Heart-pit, especially if pressed, Pain in the Head, and Heat of the whole Body, with Purple Spots, not very Thirsty, the Tongue and Urine natural in the beginning, except that the Tongue be sometimes white, seldom dry, and never black, a *Phrensie* and encrease of the Spots from a hot *Regimen.* There are Symptomatic Sweats in the beginning, irregular Practice protracts the Fever to five or six Weeks, if Death prevent not. Critical *Salivation* towards the end, terminates the Distemper, if cooling Medicines have been

given, and neither violent Sweats, nor Purging prevented it.

§ 14. Where the Strength will bear it, he begins with Bleeding, which he repeats every other Day, and gives a Glister on those Days he does not order Bleeding, and cooling Julaps, with Whey, or Barly Water, *ad libitum*: The Patient must rise out of Bed every Day, notwithstanding he Sweats: A *Symptomatic Diarrhœa* is best cured by *Venæsection* and Coolers. After the *Salivation* is begun, no Evacuation is proper.

§ 15. A *Diarrhœa* suppos'd to be the Variolous Fever turned upon the Guts, and of great affinity to it, raged all Summer in the Year 69: It was made worse by *Purging* and *Astringents*, but cured by the same Method with the Fever, (*viz.*) by Bleeding, and Coolers. I shall only observe here, that most Distempers have some affinity with the general ones of every Constitution; which gives an useful hint to direct us in their Cure, with greater certainty, and better success, than otherwise we could expect.

§ 16. This *Diarrhœa*, which begun the 4th Constitution, was succeeded by the foremention'd *Dysentery*, and in the be-

beginning of *Auguſt* 69, the *Cholera Morbus* was more *Epidemical* than ever he (our Author) ſaw it, which yet laſted but till the beginning of *September*, no more than it does other Years, when it is *Epidemical*, tho' from evident Cauſes, it happens at any time of the Year.

§ 17. About the end of *Autumn*, *Tormina* without Purging, or the Dry Gripes begun, but ended in Winter; yet the *Dyſentery* that begun with it, continued very *Epidemical*, but in very cold Weather ceaſed.

§ 18. The *Anomalous Small Pox* begun in *January* $16\frac{72}{73}$ as the *Dyſenteric* Fever did the *Auguſt* before, which continued all the *Dyſenteric* Conſtitution, which ended in 72.

§ 19. The *Anomalous* Small Pox begun in *January* 69, and continu'd to the end of the *Dyſenteric* Conſtitution in 72. They gave place to the *Dyſentery* always in *Autumn*, and the Dyſentery to them in *January*, till the laſt *Autumn*, in which they both raged: Beſides the common Symptoms with the other, they differ'd as follows.

In the *Diſcreet* when they are very diſtinct, they appear the 3d Day; in the re-

gular not till the 4th, they are leſs and rougher in theſe, in the progreſs of the Diſtemper than in the other; they are oftner black after they are ripen'd, than the other; ſometimes (tho' ſeldom if the Puſtules be very few) they Salivate.

In the *Confluent*, they differ in this ſometimes they ſhew themſelves the ſecond, and ſometimes the third Day, like a reddiſh uniform Tumor, which covers the whole Face harder than an *Eryſipelas* without any viſible diſtance of the Puſtules, the reſt of the Body was cover'd with numberleſs Puſtules join'd together, of a red Colour, and ſometimes, tho' but ſeldom, is there this mortal Symptom, *viz.* little Bladders between the Puſtules of the Thigh fill'd with a limpid *Serum*, which being broke, runs out, and the Fleſh under them is as black as if *Sphacilous*. About the 11th Day a whitiſh *Pellicle* appears upon divers parts of the Face, on that reddiſh Tumor before deſcrib'd: This *Pellicle* in a little time eructates a cruſty ſplendid Matter, of a deep red Colour, like concreet Blood, which ripening, grows blacker, till the Face be as black as a Coal: The fourteenth, and ſometimes

the

the ſeventeenth, is the *critical* Day in theſe, if over hot *Regimen* kill not the Patient ſooner.

In theſe all the Symptoms are more grievous, the Inflammation is greater, the Puſtules leſs and more angry, ſcarce diſtinguiſhable from an *Eryſipelas*, or the *Meaſles*, but by the times of their Eruption. When the Puſtules fall off, the ſurfuraceus Matter ſtays longer, and the Scars are worſe.

§ 20. His Cure, beſides *Hypnotics*, when either Sickneſs, Watching, or *Delirium*, Indicate (which muſt only be given to the Adult, in the diſtinct) a more cooling method muſt be uſed in proportion to the Inflammation, which when greater, drink plentifully of the *white Decoction* made very thin, or Milk and Water, both which promote the Salivation, and tho' the *Menſes* ſhould flow, yet let the Patient drink plentifully.

§ 21. The *Dyſenteric* Fever begun in *Autumn* 69, and continu'd during the *Dyſenteric* Conſtitution. This Fever ſeiz'd thoſe who had no *Dyſentery*, only ſometimes they had ſlight Pains, either with or without Stools. It had all the Dyſenteric Symptoms except Purging,

and

and its consequents; in the first Year of this Constitution, there were some gentle Pains, but after that scarce any: They Sweat very little or none at all, but the Pain of the Head is greater in this than in the *Variolouse*; tho' the Tongue, as in the *Variolouse*, be moist, and white, yet hath it also a white *Pellicle* over it: It seldom terminates by Salivation, as the other doth. In the declension, the Patient is more troubled with *Apthæ*, than in any other Fever, especially after a hot *Regimen*; if Sweat be forc'd in the beginning, it causeth a *Coma*.

§ 22. The Cure is, by Bleeding and Purging every other Day, for several times without Opiats after them: Use a slender Diet. After the second Purging the Patient may eat Chickens, and three Days after the last Purge, if the Patient be very weak, as *Hysterical* Women generally are, a gentle Opiat mightily recruits, but does hurt before.

§ 23. The regular *Measles* begun in *January* $167\frac{1}{2}$, encreased till *March* the Tenth, then decreas'd till *July*, when they quite disappeared. The *Small Pox* abated in *August* 71, and the *Dysentery* returned more violently than before, but in the

the Winter gave place to the *Dyſenteric* Fever, and Small Pox again, which raged all Winter. (*February* is the common *Epocha* of Vernal Fevers, as *July* is of the *Autumnal*) in the beginning of *February* a *Tertian* took place, tho' not very *Epidemical*, the other Fevers abated, and the *Tertian* vaniſh'd about the Summer Solſtice, as the Vernal *Tertians* commonly do. In *July* 72, the Dyſenterick Fever begun again, tho' milder in the latter end of *Autumn*, when the *Dyſentery* return'd, which gave place again in Winter to the Dyſenteric Fever, and the Small Pox; when I ſay one gave place to another, I only mean they were not ſo *Epidemical*, for each Diſtemper generally invades ſome, throughout the whole Conſtitution.

§ 24. Through this Conſtitution the *Dyſenteric* Fever begun in *July*, the *Dyſentery* was *Autumnal*, the Small Pox begun in *January*, the *Dyſenteric* Fever abated, and the Small Pox continued til *July*, when the *Dyſenteric* Fever begun again.

§ 25. The fifth Conſtitution takes Place from the beginning of *July* 73. In the beginning of this Conſtitution the Fever gave greater ſigns of a more Spirituous

rituous Inflammation, (as moſt *Epidemical* Diſtempers do) than it did afterwards; for at its beginning, as alſo the Spring after, there were ſigns of a *Pleuriſie*, the Blood was Pleuritick the firſt or ſecond time the Vein was open'd.

Beſides the Symptoms common to all Fevers, there are theſe eſpecially in this, *viz.* violent Pains in the Head and Back, a *Stupor* and Pain in the Joints, a tenſive Pain in the Limbs, and even the whole Body, but leſs than in a Rheumatiſm; for the firſt Days, Cold and Heat ſucceed each other: Sometime in the beginning of the Diſtemper they Sweat a little, when the Fever is left to it ſelf, the Tongue is moiſt and whitiſh, and ſcarce any Thirſt, the *Urine* almoſt natural, but if the Patient be heated too much, the Tongue is dry, and of a Colour between brown and yellow a great Thirſt, and the Urine very red; if it be rightly treated it ends in 14 Days, if otherwiſe, then not till the 21t. Sometimes the Patient hath a *Coma*, which laſts two or three Weeks, and then he recovers not till the 28th or 30th Day. The firſt ſign of it is the deſire of ſome abſurd or unaccuſtomed Meat, which may be granted him in a little quantity.

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Sometimes the Head nods, this and that way, by reaſon of Weakneſs; faint Sweats which ſucceed the Fever, may be cured by generous Wine. A Dyſentery and Diarrhœa in Autumn, 75, ſucceeded, which was nothing elſe but this Fever thrown upon the Guts.

§ 26. The firſt thing in the Cure is to let Blood, then apply a *Veſicatory*, and after that give a Clyſter every Day, and uſe a cold *Regimen*: After the 14th Day leave 'em to Nature, give Small Beer *ad libitum*, and if there be a *Phrenzie*, drop *Spirit* of *Vitriol* into it.

§ 27. This Fever was not very *Epidemical* till *July*, in the Year 75, neither were the forementioned Fever, nor the Small Pox, that begun in 70 quite excluded in 73, tho' the Symptoms of the latter were much milder, there were yet, *viz.* in 73 a few in the Dyſentery, the Small Pox kept pace with the Fever, I laſt deſcrib'd, all Winter, but neither very *Epidemical.* In *Chriſtmas*, being very warm after a hard Froſt, there were ſome Dyſenteries which then quite ceas'd.

§ 28. In *January* 167$\frac{4}{5}$, the *Anomalous Meaſles* begun and encreas'd till *March*, and ceaſed in *June.* They were very

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Epidemical, the *Febris Morbillosa* bore the same Date, and had the same Period. At the same time begun the *Black Small Pox*, which raged more or less, till about *June* 75.

The *Anomalous Measles*, as they were very *Epidemical*, so were they Mortal, if wrong treated; the Eruption happened sometimes sooner, and sometimes later than the fourth; the Pustules in these first occupied the Shoulders and Trunk, in the other, *viz.* the Regular, the Face, the branny Scales which defile the *Cuticle* in the end of the Distemper, in the other, rarely happen in these, the Fever and *Dypsnœa*, in the end of the Disease, are more vehement, and liker to a *Peripneumonia* in these, than in the other.

§ 29. The Cure. Put them to Bed two Days before the Eruption, with their usual covering, give them Oat, or Barly Grewel, roasted Apples, small Beer, Milk and Water, and a Pectoral Ptisan.

§ 30. The *Febris Morbillosa* differ'd from the Measles, in that the Pustules which imitated the Measles were few, and broke out on the back of the Neck and Shoulders, and some on the Trunk; the

the Fever is of the same kind with the Measles, but more vehement, and sometimes continued 14 Days or more. Bleeding and Glisters do harm, it is cured like the Measles of the same Constitution.

§ 31. The Black Small Pox, which begun *January* $167\frac{3}{4}$. The Confluent were of a fuscous Colour whilst unripe, but black when ripe, they differ but in few things; from the *Anomalous* in 69 they are more Putrid, and smell worse: When ripe their Matter is more gross, and more difficultly digested. This is worth remarking, that by how much the milder the Small Pox are, by so much sooner the Pustules ripen; for in the regular Confluent, the Patient was past danger the 12th Day, in the Anomalous Confluent in 70 they were past danger the 15th or 17th Day; but in these they often die after the 20th Day, and sometimes if they recover (which rarely happens) the Legs not only swell, (as they commonly do in all the Confluent kind) but the Arms, Shoulders, Thighs, and other Parts, with intolerable *Rheumatick* Pains, which sometimes end in *Impostumations* of the Musculous Parts, by which the Life is in danger after

after the Pox hath left them. These Pox are almost as fatal as the Pest.

§ 32. The Cure. A hot *Regimen* encreaseth the Fever, and causeth a *Pleurisie* and Purple Spots: Too cold a *Regimen* hinders the Swelling of the Face and Hands, and prevents the plumping of the Pustule, which are all necessary. Most dy'd that us'd the method formerly prescrib'd, but not with the following, *viz.* after the 5th or 6th Day, the Patient must drink plentifully of small Beer, with *Spirits* of *Vitriol* in it, to the end of the Distemper, especially at the maturation of the Pustules when the Fever is highest. The Adult must have *Laudanum* every Night after the Eruption; a Glass of Sack may be given towards the end of the Distemper, if the faintness of the Patient require it.

§ 33. After a very warm Season, which continu'd to the end of *October* 75, sudden cold and moist Weather succeeded, which occasion'd the most *Epidemical Cough* that ever our Author observ'd, which ended in a Fever, like that in 73, and counterfeited a *Pleurisie*, and *Peripneumonia*; there was Pain in the Head,

Head, Back and Limbs, it abides not the Bleeding that a true *Pleuriſie* doth.

§ 34. The Cure. When there is nothing but a Cough, a cooling Diet without Fleſh Meat, and Strong Drink, is ſufficient. If the Fever be begun, Bleed, apply a Bliſtering Plaiſter to the Neck: Give every Day a Gliſter: Keep not too cloſe in Bed: Bleed again the third Day, if the Pain abate not, and continue Gliſters, but not to *Hyſteric* and *Hypochondrical* Perſons, and if extraordinary Heat requires it, Bleed again.

§ 35. I had not been at ſo much Pains to contract and methodize the Doctor's Hiſtory of theſe Diſtempers, but that it is the moſt exact of any extant, and done by one on whoſe Integrity we may depend, and to render it more uſeful by the ſucceeding Corollaries. It is not enough to read ſuch a Hiſtory, tho' never ſo True and Critical, the Memory being not able to retain the Tenth Part of it, even tho' it were contracted; but we muſt carefully conſider each part ſeparately, and ſo compare one part of the Hiſtory with another, as to draw general Concluſions from them, which being but few in Number, are eaſily remembred, and ſo will become uſeful in Pra-

ctice. And if every one that is capable wou'd contribute his ſhare to ſo beneficial an Undertaking, we might in a little time be furniſh'd with *Maxims* to direct us in a more ſucceſsful Practice, than what is known at preſent.

Corollaries from the preceeding Hiſtory.

I.

Different Conſtitutions of the *Air* the cauſe of different Diſtempers, and thoſe Diſtempers are generally ſtated and regular, as appears from the Hiſtory in general.

II.

The Diſtempers of each Conſtitution having an affinity to each other, tho' they differ in ſeveral reſpects, yet require ſomething common in their Cure, as proceeding from a common Cauſe: So that he who is able to Cure one *Epidemical* Diſtemper in any Conſtitution, hath an advantage in the Cure of all the other. By § 7, 13, 15, 18, 21, and 30.

III.

III.

Intermitting Fevers and ſuch continual ones as are allied to 'em, are protracted by a cold *Regimen.* By § 3. and § 6. compared with § 7.

IV.

To know how *Specificks* operate in the Cure of Diſtempers, is not only uſeful to the right adminiſtring of 'em, but alſo ſhews us how to improve their Vertues. By § 8.

V.

Cold, Froſty Weather, often puts an end to *Epidemical* Diſtempers, ſuch as the *Plague*, *Small Pox* and *Dyſentery.* By § 11, 12, 17.

VI.

A hot *Regimen* pernicious in the *Small Pox*, *Dyſenteric Fever*, and in moſt continued ones, the worſt Symptoms are owing to it. By § 13, 19, 21, 25, and 32.

VII.

There is a conſent between the Skin and the Inteſtines, according to *Baglivi*'s Obſervation. By § 19, 23, and 24.

VIII.

Plenty of cooling Liquors proper in the *Small Pox* and *Inflammatory Fevers.* By § 20, 26, and 32.

IX.

The *Small Pox* and *Meaſles* generally begin in *January.* By § 18, 19, 23, 28, and 31.

X.

A cold and moiſt Conſtitution of the Air diſpoſes to an *Epidemical Cough.* By § 33.

XI.

Hypochondriac and *Hyſteric* Perſons are not to be treated like other People in Fevers, they cannot bear ſo large Evacuations. By § 34.

CHAP.

CHAP. VI.

Of Bathing.

§ 1. TO what I have writ concerning the *Air*, I ſhall ſubjoin ſome Thoughts of the Nature and Uſe of *Bathing*, by which we are render'd ſometimes more, and ſometimes leſs capable of bearing the Injuries of it, *viz.* the Air, according to the Heat, Temperature, or Coldneſs of the Bath. To which I ſhall annex ſome Obſervations upon, and Directions about wearing of Flannel.

§ 2. Tho' Bathing hath been mightily neglected in the laſt Age, yet it hath been the Ancient Practice both of the *Jews* and *Romans*, not only as a Cure of ſeveral Diſtempers, but alſo for Cleanlineſs and Delight. The uſe of the Bath, eſpecially the Cold, is ſo much reviv'd within this few Years, and the ſucceſs of it in the Cure of many Diſtempers being ſo extraordinary, I queſtion not but, in a little time, Bathing

will be as much in vogue among us, as heretofore among the Ancients.

§ 3. *Sanctorius* tells us, That Swimming in Cold Water hinders Perſpiration. (*m*) And

That the Flux of the Belly is cured by promoting Perſpiration, (*viz.*) by Warm Bathing. (*n*)

That *Hypochondrical* Perſons are much eaſed, if their Bodies be render'd Perſpirable by frequent Bathing. (*o*) And

That Waſhing with Cold Water heats robuſt Bodies and refrigerates weak ones. (*p*) And

Warm Bathing, unleſs Crudities withſtand, helps Perſpiration, and refrigerates the internal Bowels. (*q*)

Bathing hath been often uſed with Succeſs in the *Scab*, the *Leproſie*, *Elephantiaſis*, and moſt Defædations of the Skin. In variety of Pains, as *Chronical Rheumatiſms*, *Gout*, *Sciatica*, *Lameneſs*, from either too great contraction, or relaxation of the *Tendons*.

(*m*) *Aphor.* 67. § 1.
(*n*) *Aphor.* 92. § 1.
(*o*) *Aphor.* 102. § 1.
(*p*) *Aphor.* 1. § 2.
(*q*) *Aphor.* 2. § 2.

I ſent a Gentlewoman to St. *Mongath*'s Well, who was cured of an *Oedematous Tumor* in her Ancle, by Bathing; which wou'd not yield to any Method that had been uſed, as Plaiſters, diſcuſtive Fomentations, with *Sal Armoniac* diſſolv'd in 'em, Tinctures of *Myrrh* and *Camphire*, *Oyl of Tartar*, *per deliquium*, laced Stockins, *&c.* She bath'd her whole Body once a Day, to give a general Contraction and Tenſity to all the Veſſels, and promote a diſſolution and better circulation to all the Humors; but bath'd her ſwell'd Leg ſeveral times every Day, and kept it not too long in the Water at a time, for fear of chilling it; ſo that the Vibrations of the Fibres being made ſtronger and quicker ſo often in a Day, the obſtructing Matter was remov'd, and the Veſſels enabled to reſiſt the diſtending Power of freſh Humors.

I am perſwaded that a prudent management of the Cold Bath, wou'd be very powerful in the relief of *Cachectic* and *Hydropic* People, provided the Diſtempers be not too far advanc'd, and ſome dangerous Symptoms in a *Conſumption*, if the *Lungs* be ſound, would better be remov'd this way than any

other: But this is not to be attempted without the advice of some judicious Physician: 'Tis a Specifick in the *Rickets*; *Hæmorrhages*, whether from the Nose, Guts or *Uterus*, are not only stopp'd by Cold Bathing, but the return prevented. Nothing more certainly gives ease, and effectually promotes the passing of Stones in a *Nephritic* Fit, than Warm Bathing. And (*r*) *Baglivi* tells us, That *Dolor Colicus fere semper mitescit in Semicupio.*

Bathing will always act the part of a *Diuretic*. And plunging over the Head in Cold Water, especially in *Sea Water*, will do more in the Cure of Melancholy, Madness, and particularly of that occasioned by the bite of a Mad Dog, than any other Medicine. There is nothing more adapted to the Cure of *Frigidity*, when owing to a former excess of *Venery*, than the Cold Bath.

It will also contribute its share to the Cure, both of a Simple *Gonorrhœa*, and *Fluor Albus*. 'Tis often successful in a *Palsie*, and they who use it much are very little affected with the change of

(*r*) De Praxi Medica, *p.* 70.

Wea-

Weather; and yet the abuſe of Bathing is very prejudicial; for Bath-guides are generally of a pale and ghaſtly Countenance, of a bloated habit of Body, with ulcerated and ſwell'd Legs, which often ends in a *Dropſie*.

§ 4. Tho' Bathing hath been us'd with advantage in all the Caſes I've mention'd; yet there is ſcarce any of 'em all, but in ſome circumſtances it would be prejudicial: So that to reap the beſt advantage we can by reading the Hiſtory of Cures perform'd by it, it is fit we ſhould enquire what alterations are made by it in a Humane Body, that ſo we may know in what conditions to order it, and what not.

§ 5. I've already obſerv'd, That our Bodies are preſs'd upon by a Weight of *Air*, when the *Mercury* ſtands higheſt in the *Barometer*, equal to 3990 Pounds *Troy*. Now if this Weight be either conſiderably encreas'd or leſſen'd, as 'tis often upon the change of Weather, and the influence of the *Planets*, it will certainly make a great alteration in the Fluids of our Bodies, as I have proved before: But this preſſure is never ſo much augmented as when we Bath our ſelves: For *Water* being above 800 times

hea-

heavier than *Air*, must needs greatly encrease the pressure: And a Body sunk 35 Foot in Water, sustains double the Weight it does in the Air; and though when we are near the top, the pressure upon our Bodies is mightily lessen'd, yet 'tis much greater than in the open Air, so that all the consequents of a greater pressure will happen upon Bathing.

The tender *Fibrillæ*, of which the Skin is compos'd, being unequal in Strength and Tensity, some of 'em will more resist the pressure of the Water than others; from whence proceeds that *Rugosity* of the Skin upon Bathing.

§ 6. 'Tis certain that the surface of the Body, and those parts adjoining to it, will be the most and first compress'd, and those at the Center the least and latest; so that the Blood will be forced in great plenty upon the *Viscera*, where there is the least resistance: For this reason, it is never safe for those to Bath who have weak or ulcerated Bowels; nor can they, without danger of Life or Swooning at least, who have a very weak Pulse, enter into a Cold Bath. The 4th *Aphorism* in the 3d §. is only accounted for this way, *viz. That Cold Bathing heats robust Bodies, and refrige-*

rates

rates weak Ones: For the contraction of the Heart in robuſt Bodies being ſtrong, makes the greater conflict with the reſiſtance it meets with in promoting the circulation of the Blood in ſuch as enter the Cold Bath; whereby the Blood is more broken, and the hot Particles ſet at liberty. On the contrary in thoſe who are weak, the contraction of the Heat is but juſt able to continue the Blood in its circulation, which will, by reaſon of the reſiſtance it meets with, be ſlower than before, and therefore they will have a ſenſe of Cold, or be refrigerated.

§ 7. One that goes into a Cold Bath, if he plunge not himſelf over-Head, is ſubject to the Head-ach; the reaſon of this is plain, from what I have obſerv'd before; for there being the leaſt reſiſtance to the circulating Blood in the Head, which is preſs'd upon only by the Weight of the Air, it will run in ſuch plenty thither, as to diſtend the Veſſels beyond their uſual Tone, and thereby occaſion a Senſe of Pain. And why People are ſo chearful, brisk and lively after Bathing, is not only becauſe the perſpirable Matter is thrown off more plentifully, (according to *Sanctorius*'s

ctorius's Obſervations (*s*) *viz. Melancholy is overcome by a free Perſpiration*, and (*t*) *Chearfulneſs, without an evident Cauſe, proceeds from Perſpiration ſucceeding well*) but alſo from a Senſe of leſs Weight upon the Body. A Perſon two Foot under Water (as they often are who uſe Bathing) ſuſtains a Weight of Water added to that of Air (ſuppoſing ſtill the *Area* of his Skin to be equal to 15 ſquare Feet) equal to 2280 Pounds for 2, the number of Cubical Feet of Water preſſing upon a Foot ſquare of the Skin × 76, the number of Pounds in a Cubical Foot of Water is = 152 × 15, the ſuppos'd number of ſquare Feet on the ſurface of the Body is = 2280 Pound *Troy*.

§ 8. So that the firſt and moſt obvious conſequence of Bathing, is by a greater preſſure upon our Bodies to ſtraiten the Veſſels, and thereby diſſolve the Humors, and make 'em fitter to paſs the Glands to be evacuated, as alſo to ſqueeze out any Viſcid Obſtructing Matter that ſticks to the ſides of the Veſſels, and renders the motion of the

(*s*) *Aphor.* 17. § 7.
(*t*) *Aphor.* 23. § 7.

Flu-

Fluids of our Bodies more free and eaſie. In the next place, they who enter into the Bath have the quantity of their Blood mightily encreas'd in the *Brain* and *Viſcera*, being forc'd thither where there is the leaſt reſiſtance; and the quantity of ſeparated Matter in any Gland, being as the quantity of Blood multiply'd into its Celerity at the reſpective Glands, (*u*) the quantity of *Animal Spirits*, of *Urine*, of *Gall*, *Succus Pancreatis*, &c. will be mightily encreaſed, and any impediment to the Secretion of theſe Fluids will probably be removed, theſe Liquors flowing with a greater celerity. So that

1. If we wou'd have the Blood diſſolv'd, 2. or any Viſcid Matter adhering to the ſides of the Veſſels remov'd, 3. or the Glands ſcour'd, 4. or a greater quantity of Spirits generated and moved with greater celerity through the Nerves, 5. or wou'd force Urine, 6. or remove obſtructions in the *Liver*, *Spleen*, *Pancreas* and *Meſentery*, if they be not grown too obſtinate, in which caſe 'tis dangerous) we ought to order Bathing.

(*u*) Pro. 17. *Of Animal Secretion.*

It is for the 1, 2, and 3d reaſon, that it Cures the *Itch*, *Leproſie* and *Elephantiaſis*; it is for the 4th reaſon, together with the former, that it cures the *Palſie*, *Melancholy*, *Madneſs*, and the bite of a *Mad Dog*; it is for the 5th that it helps the paſſage of Gravel, for the 6th join'd with the other, that it helps *Cachectic*, *Icteric*, and *Hydropic* People, before the Diſtempers be too far advanced.

§ 9. Theſe ends which are compaſs'd by a greater preſſure, are more effectually obtain'd by whatever encreaſeth the Weight of the Water, or contracts the Fibres of our Bodies; it is the Salt in the Sea-Water whereby its Weight is increas'd, that makes it more uſeful in the Cure of thoſe who are bit with a Mad Dog; and the deeper you plunge 'em the more effectual will it be, for a reaſon that I have given before.

We know by Experience, that Cold contracts, and the more ſuddenly it is apply'd to our Bodies, the more violently it operates; but how much it contributes to the obtaining of the forementioned ends we cannot certainly know, having no Rule by which we may meaſure the quantity of Contraction cauſed by it.

But

But that it is very conſiderable we need not doubt, having ſo many Experiments to prove it. The Contraction of the Fibres is propagated throughout the whole Body, upon which Score all the Humors in the Body, muſt be propell'd with greater force through the Veſſels in which they circulate; beſides that the Tenſity of the Fibres being greater, their Vibration will both be quicker and ſtronger, and that in proportion to their encreaſed Tenſity) ſo that the Blood and Spirits will not only move more ſwiftly through the Canals, but alſo be extremely ground and broken; from whence all the effects of more Fluid Blood and Spirits, moving with greater Velocity, will neceſſarily enſue upon uſing the Cold Bath. Theſe Things which I've ſaid, compared with the Conſtitution of the Patient to whom Bathing is preſcrib'd, will give you the time he ought to ſtay in it, the number of times, (with the intervals between them) he ought to uſe it, the neceſſary Preparations for it, and what is to be done after it.

It is upon the account of the contracting Power of the Cold Bath principally, that it ſtops *Hemorrhages*, *Gonorrhœa*'s and

and the *Fluor Albus*, as alſo that it Cures *Venereal Impotency.*

Where the peccant Matter hath been made more Fluxil, either by Medicines, Diet, or a regular uſe of the Warm or Temperate Bath, in Chronical *Rheumatiſms*, *Gout*, *Sciatica*, *Lameneſs*, &c. the violent contracting Power of the Cold Bath, will often perfect the Cure. A *Nervous Atrophy*, which (*w*) *Baglivi* probably conjectures to be owing to an univerſal relaxation of the Nerves which terminate in the Skin, is as likely to yield to the Cold Bath as any other method, provided the Pores, by Contraction, were not ſhut up too ſuddenly; for it would then throw the detained Matter upon ſome other Glands, whereby an Evacuation more dangerous might ſucceed.

§ 10. The next property of the Bath, diſtinct from its Weight and Coldneſs depends upon its being *Moiſt*, and by this quality of the Water, it ſoftens, relaxes, and makes pliable all the parts of our Body, as ſufficiently appers by ſteeping any part of an Animal-Body in Water,

(*w*) De Fibra motrice & morboſa, *p.* 67.

even

even the Horns and Hoofs of Beafts will become ſoft and flexible, by a long immerſion in Water, eſpecially if warm.

And that Water, as moiſt hath a property of relaxing, as 'tis prov'd by Experiment, ſo 'tis no way inconſiſtent with what I've ſaid of the preſſure of Water in general, nor the contracting force of the Cold Bath in particular, the preſſure of the Water is conſiſtent enough with relaxing and ſoftning of Bodies that are immers'd in it; for the Weight of the Water will enable it to inſinuate it ſelf into the Pores of the immerſed Body, whereby it will become more ſoft and flexible; and yet before it hath done this, will force together the ſides of any yielding Veſſel, ſuch as thoſe of a Humane Body are, and thereby preſs out their Contents with a Velocity proportionable to the Weight incumbent on 'em: So that after the Humors have been put in violent Motion by the preſſure of Bath-Water, if the Perſon ſtay any conſiderable time in, he will have the Solid Parts of his Body ſoftned, relax'd and made flexible. This Hint is of great uſe to determin the time our Patients ought to ſtay in the Bath in ſome Diſtempers more than others.

Now I ſhall enquire how the contracting Power of Cold, and the relaxing Power of Moiſture can agree in the ſame Subject: That they cannot act intenſly at the ſame time, but their actions will deſtroy the effect one of another, is evident to any who conſider that contrary Qualities are inconſiſtent in the ſame Subject, at the ſame time; but as I obſerved in the laſt Section, Moiſture acts very ſlowly, and muſt be a long time in performing its work, whereas Cold acts quickly and on a ſudden, as we know by a multitude of Experiments: Wherefore tho' the Cold Bath may Contract at firſt, yet by ſtaying too long in it, it would Relax; but there are none who are able to bear the Cold ſo long as to produce the latter Effect. The principal reaſon why Cold ſo violently contracts the Membranes of our Bodies, is by making an ungrateful Senſation, for ſuch is the frame and conſtitution of the Animal Oeconomy, that the Soul has a Power of contracting, or relaxing, the Membranes, and Veſſels of the Body, ſo, as beſt to ſerve the purpoſes of Life; and tho' we know not how the Soul operates upon the Body, yet would it be the greateſt Folly to deny that which we daily experience

ence to be true: We every Day obſerve by the command of our Wills, that the Members of our Bodies are mov'd a thouſand different ways, and 'tis as eaſie to imagin the Soul acts immediately upon the Nerves and other Solid Parts of the Body, as upon the Animal Spirits, being that Spirit can act as eaſily upon Solid Matter as that which is Fluid; the mode of its operating being altogether unknown to us. In a relax'd State the Body is Weak, Feeble and Unactive, and in this condition it is in all the Paſſions which are attended with Pleaſure: On the contrary, whatever Paſſions of the Mind are attended with Pain, Grief, or any kind of Uneaſineſs, as Malice, Revenge, Fear, a Fright or Surprize, puts the whole Body into a contracted State, as appears by the ſhrinking the Veins, ſparkling of the Eyes, contraction of the Pupil, paleneſs of the Face, and eſpecially of the Lips; and this is none of the meaneſt diſplays of infinite Wiſdom and Goodneſs, for the preſervation of Man: For by this means he is ſtrongeſt when he has the moſt occaſion for it, either in reſiſting force when he thinks he can overcome it, or elſe in flying from it; in doing of which upon a

Fright, ſome have exerted ſuch agility of Body as is almoſt paſt Credit, were it not the common Obſervation of Mankind how Vigorous and Active we are in ſuch iCrcumſtances. The reaſon of this exceſſive Strength when the Veſſels of the Body are contracted, is evident from Dr. *Cheyne*'s Propoſition about the Strength of Animals, (*viz.*) 'That 'tis 'in a triplicate Proportion to the quan-'tity of Blood running in the Veſſels: Now the quantity of Blood is mightily encreas'd, in the proportion it bears to its Veſſels, when they are contracted, to what it is when relaxed, for 'tis the ſame thing to all intents and purpoſes, whether the Veſſels continue of the ſame wideneſs, and the quantity of Blood be encreas'd, or the quantity of Blood continue the ſame, and the Veſſels in which it runs be ſtraitned or contracted; ſo that we may expect the ſame Strength in an Animal, whoſe Veſſels are contracted to half their wideneſs, as we may from an Animal whoſe Veſſels are in their former condition, and the quantity of his Blood doubled; ſo that beſides the advantages common to all ſorts of Bathing, there is this peculiar in the *Cold Bath*, That it

it gives a violent and universal Contraction to all the Membranes and Vessels of the Body; and there is nothing so surprizing in the sudden Cures it performs, but what is accountable from this Cause.

§ 11. But Water hath certainly a softning, relaxing Property, when apply'd to our Bodies, and by means of this 'tis able to bring about great alterations, and as the pressure of the Water is made more effectual by Cold, so is its relaxing Power by a moderate Warmth: For a gentle Heat always relaxes the Fibres of our Body, by being pleasing and agreeable to the Sense of Feeling: So that when we wou'd have the benefit of an universal Relaxation, we ought to go into the Temperate Bath, such as *Buxton*, being the most Temperate of any that I know of in *England*. The first Advantage that many receive from the Use of this Bath, is an entire refreshment after wearines with a Journy. 'Tis a common Custom for Persons wearied with Riding, as soon as they alight to go into the Bath for a little time, by which means they become as lively and brisk as they were in the Morning: For wearines being nothing but an overstretching, or too great a tensity of the

Fibres, occasion'd by using them too long or too violently, must, upon their being relax'd, go off again: 'Tis for the same reason that Sleep takes off wearineſs.

§ 12. This universal Relaxation caused by Bathing will so widen the Pores, that a vast quantity of perspirable Matter will be carry'd off, more than at another time: 'Tis for this reason that some corpulent People have, in a Fortnights time, lost above two Stone Weight by using of this Bath; and all the advantages of a free Perspiration may be gain'd this way, tho' it be true, we are more obnoxious to catch Cold afterwards: Yet I think a cautious Use of the *Cold Bath* after the *Hot*, might not only prevent that Inconveniency, but in many cases render it much more beneficial. I've known that Bath I am speaking of, to remove violent Pains in the Head, Back and Joints. A Gentleman of my acquaintance had a fixed Pain in his Breast for almost two Years, and was reliev'd by four or five times Bathing in this Bath. It helps a Chronical *Rheumatism*, *Gout*, and the *Cholick*, *Lameness*, *contraction* of the *Tendons*, &c. and how all these are perform'd is easily known by the foregoing Theory. But,

§ 13.

§ 13. All the effects of Warm Bathing are better brought about by the Water insinuating it self into the Body thro' the Skin, for being mixed with the Blood it doth dilute and dissolve the Acrid Salts in the *Serum*, by which they are better carried off, thro' the proper Glands design'd for their Evacuation: So that 'tis useful in all Distempers, where too much *Salt* abounds, as the *Scurvy*, and most *Cutaneous Diseases*.

Tho' it be a general receiv'd Notion that Bath Water enters into the Body, and so mixes it self with the Blood, yet most believe it upon very indifferent grounds, or having never examin'd the Reason of the thing, nor consider'd the Objections against it. That Water hath a wonderful Power of insinuating its self into any contiguous Body, appears from several Experiments. We see how Deal-boards will swell against Rainy Weather, the Watry Particles floating in the Air by the pressure of the Air upon 'em, are forced into the slender Tubes of the Wood, where they meet with no resistance, the Particles of Air being too large to enter the same: It is certain, however true the contrary may appear to be, that the

compounding Particles of Water, are leſs than thoſe of Air, being the former will paſs thro' ſeveral Bodies, that the other will not. It will force it ſelf thro' the Skins of Animals even after they are dry'd and converted into Leather. (x) *Bellini* try'd the Experiment upon the Skin of a Mans Head, which after it was moderately dry'd, ſuſpended it with a Stone in it, to ſink it in the Water, and in a few Hours time the Water had forced its paſſage thro' it: But nothing ſhews more the force of Water to enter into contiguous Bodies, than the following Experiment.

Faſten a piece of Whipcord, or a ſtrong Rope, of what length you pleaſe, (but the longer the more viſible will the Experiment be) to a Hook, or Staple, and at the bottom of the Cord hang any weight ſhort of what will break it, tho' never ſo great: You will find that the weight will riſe in Moiſt Weather, and ſink lower in the Dry: You may alſo raiſe the Weight by moiſtning the ſides of the Cord by a wet Sponge; by this means a few Particles of Water may overcome any finite

(x) De Urinis & Pulſib. *p.* 146.

Re-

Reſiſtance if the Cord would bear it. Now ſince there is but a little quantity of Water, and that driven into the ſides of the Cord, with a force no greater than the Weight of a Cylinder of Air incumbent upon the Water; therefore muſt the Water act by ſome property whereby its force is greatly augmented, and that can be no other than that of the *Cuneus*; and the forces of Wedges are to one another reciprocally proportional to the Angles their edges make; but in Spheres the greater or leſſer degree of Curvity is to be conſider'd, as their Angles, when Spheres are conſider'd as Wedges; and the degrees of Curvity in Spheres are reciprocally as their *Radii*. Now the Particles of Water being ſo infinitely ſmall, leſs by much than thoſe of Air, muſt, when acting as Wedges, have their Powers infinitely increaſed, ſo as to overcome any finite Reſiſtance: Now let the reſiſtance the Water meets with, in entering into our Bodies be what it will, yet 'tis hard to believe its greater than what I've mention'd, which yet a little quantity of Water will overcome. The Experiments I have taken notice of, were made upon the Skins of Dead

Men,

Men, or Beasts, which, would have put the Matter beyond dispute, had they been made upon such as were alive. The only difference then being that in the Living, Steams or Vapours are constantly raised into the Air, through the pores of the Skin, in Insensible Perspiration; which is not so, in those that are Dead. These Vapours, tho' raised with a considerable force, are yet unable to withstand the *Impetus*, with which Water endeavours to insinuate it self into contiguous Bodies, being so great as I have explain'd. And tho' the quantity of perspirable Matter, is very great in 24 Hours, being (*y*) $\frac{5}{8}$ of the Meat and Drink a Man takes in a Day; yet if we compute the quantity that perspires from any part of the Skin, in a given time, we shall find it too little by far to hinder the entrance of Water into the Body when we go into a Bath. For Dr. *Pitcarne* (*z*) hath demonstrated that the matter of Insensible Perspiration in a Minute, is the 1200 part of the place it comes from, (*viz.*) ℈i of the

(*y*) Sanctorii Medicin. Stat. *Aphor.* 6. § 1.
(*z*) Dissertationes Medicæ, *P.* 130.

Skin

Skin perſpires $\frac{1}{1200}$ℨ in a Minute, and conſequently ℨi of the Skin perſpires $\frac{1}{1200}$ℨ. in a Minute, now ſuppoſe a ſquare Inch of the Skin weigh ℨi then a ſquare Inch perſpires $\frac{1}{1200}$ℨ in a Minute; but a ſquare Inch of the Skin is preſſed upon by a Weight when we Bathe, more than in the open Air, equal to 96 Drams. For we may conclude that our Bodies taking one part with another, are two Foot under Water, when we Bathe our ſelves: So that every ſquare Inch of our Skin muſt bear the Weight of 24 Cubical Inches of Water equal to 96 Drams: For a cubical Inch of Water being ℨiiii $\frac{384}{17}$, throwing away the Fraction, 24 cubical Inches muſt be 96 Drams: Now ſince only the $\frac{1}{1200}$ℨ. of Matter is perſpired through a ſquare Inch of the Skin in a Minute, therefore is the Elevation of the perſpirable Matter reſiſted by a Weight 115200 times greater than it ſelf; for $1200 \times 96 = 115200$. How great then muſt be the Celerity with which the perſpirable Matter moves, if we imagine it able to raiſe a Body 115200 times heavier than it ſelf? thus would it be, if the whole quantity of perſpirable Matter evacuated in a Minute,

was

was to exert its force at once upon the incumbent Weight of Water; but it is ſo far from doing that, that if the exhalation of the Steams be not continual, as the preſſure of the Water is, yet the intervals betwixt the times they are propell'd from the Body are very ſhort; ſuppoſe 60 of them in a Minute, being about the number of Pulſes that a healthful Mans Artery beats in the ſame time: Then will the quantity of Vapour, which exerts its force at once againſt the incumbent Water, be ſixty times leſs than what I firſt aſſign'd; which being multiplied by 1200=72000, the number of Parts into which a Dram of perſpirable Matter is divided, one part only of which exerts its force againſt 96 Drams of Water in a ſecond: So that the perſpirable Matter that riſes, every Second muſt raiſe a Weight 6912000 times greater than its ſelf, if it reſiſt the entrance of the incumbent Water; for 90 the number of Drams of Water, incumbent upon an Inch ſquare on the Skin, multiplied by 72000 the number of Parts into which a Dram of perſpirable Matter is divided, is = 6912000 the difference between the quantity of Matter perſpired in a ſecond,

cond, and the quantity of Water by which its Motion is resisted.

I think by this time it sufficiently appears that the Bath Water will mix it self with the Humors of the Body, so that there is nothing so wonderful in Bathing, but what may be accounted for from some of these Properties of Water I've mention'd, without having recourse to the Salts with which Bath Waters are impregnated; which yet may contribute their share in the Cure of some Distempers. What I've said about Bathing, as 'tis mostly new, so are my Reasonings founded upon known Experiments; and how just my Inferences from 'em are, I leave to the Judgment of my Reader (supposing him to have the necessary Qualifications and a moderate Attention) to determine.

§ 14. To apply the general Proposition, *viz.* That Bath-Waters act upon a Humane Body by their Weight, (by contracting or relaxing the Solid Parts, and diluting the Fluids of the Body) in all Distempers wherein Bathing might be beneficial, or injurious, wou'd take me up more time than I've now to spare, tho' I may, perhaps, find a more seasonable opportunity of doing it.

Of

Of wearing Flannel.

I ſhall now, according to my promiſe, ſay ſomething concerning the wearing of Flannel. By what Fate ſo many of late fall in with an Opinion of the advantage of wearing it, I can't tell; but this I'm well ſatisfied of, that it does hurt to two for one that receives benefit from it, and there is none to whom Flannel is more prejudicial than thoſe to whom 'tis generally preſcrib'd, being Weak, Faint, or Hectic People; indeed it muſt be confeſs'd that there are ſome that receive benefit by it, but they are very few, and I queſtion not but ſome aſcribe that to Flannel, which is owing to ſome other Cauſe unknown, and which had perform'd the Cure both more ſpeedily and perfectly, had the Perſon never us'd it.

A Man of a robuſt Conſtitution, who eats and drinks well, and yet uſes not Exerciſe enough to throw off the Remains and Dregs of a full and nouriſhing Diet, and who is ſubject to *Defluxions*, *Catarrhs*, *Pains* in the *Joints*, and ſuch Diſtempers as are owing to a *Plethora*, will receive benefit by wearing

ing Flannel, tho' too long an uſe of it may ſo relax the Tone of the Fibres of the Skin, as to hinder that Perſpiration which before it help'd: For tho' the quantity of perſpirable Matter be in proportion to the wideneſs of the Pores of the Skin, yet they are not the wideſt when the Skin is moſt relaxed, however 'tis neceſſary that the Skin be conſiderably relax'd, that the Pores may be encreas'd to their greateſt Diameter.

The moſt certain and conſtant effect of wearing Flannel, is to make a more free and plentiful Perſpiration, which tho' it be attended with great advantages, (according to (*t*) *Sanctorius*) when moderate, yet when exceſſive nothing is more pernicious. The other Effects we obſerve from it, as they are more uncertain, ſo are they but the conſequences of this; now ſince the encreaſing of one Evacuation is the leſſening of another, therefore whenever too much is thrown off from the Blood either by Stool, Urine, or Spittle, it may be proper to wear Flannel.

(*t*) Medicin. Statica. *Aphor.* 10, 42, *and* 44. § 1.

Both

Both *Walthmeidt* (*u*) and *Baglivi* (*w*) obſerve that *Diarrhœa*'s from immoderate Grief, are incurable; and that principally from a ſuppreſſion of Perſpiration, Grief contracts the Skin as all troubleſome Paſſions of the Mind do; ſo that the perſpirable Matter being retain'd, will be thrown upon ſome other Glands, and if on thoſe of the *Inteſtines*, will continue a *Diarrhœa*. 'Tis alſo obſerv'd, that *Uſus Veneris* makes the Body Coſtive, and this it does only by promoting Perſpiration by an univerſal relaxation of all the Fibres, which is always proportional to the intenſeneſs of the Pleaſure; and for the ſame reaſon 'tis, that weak Perſons are ſubject to a Looſneſs in Winter (when the cold Air ſhuts up the Pores of the Skin) which they are free from in Summer. In a *Dyſentery* the laſt mention'd Authors above all things order the Body to be kept warm, and eſpecially the Feet, to promote Perſpiration; and the latter obſerves a conſent between the Skin and the Inteſtines, as *Hippocrates* did before him.

(*u*) De Diarrhœa inter Monita Medica.
(*w*) De Praxi Medica, *p.* 76.

San-

Sanctorius in his 46 *Aphor.* § 1. tells us, That the perſpirable Matter retain'd, neither being reſolv'd by Nature nor a Fever ſupervening, diſpoſes the Body preſently to a malignant Fever. And Dr. *Cockburn* in his Treatiſe of the *Diſtempers of Seafaring-Men*, gives Inſtances enow of Fevers from a ſuppreſs'd Perſpiration. In ſuch Caſes as this, whereby the preceeding Symptoms (as a dejection of Appetite, ſpontaneous Laſſitude, ſudden loſs of Strength, a Stupidneſs, with inclination to Sleep, the want of uſual Stools, *&c.)* a Fever is threatned, nothing will contribute more to prevent it, than reſtoring Perſpiration to its wonted freedom; and Flannel may very well act its part in this Scene. But theſe Caſes I have taken notice of, are ſuch as Flannel is ſeldom or never order'd in, tho' in theſe only we may expect advantage.

That it may appear how prejudicial Flannel is to thoſe who perſpire too much, as moſt weak People do, and to whom the wearing of Flannel is generally preſcrib'd, I ſhall obſerve from *Sanctorius*, That inſenſible Perſpiration is double to all the ſenſible Evacuations made by Urine and Stool

put together; and that 'tis to that made by Stool as 40 to 4, (c) so that 'tis Ten Times greater than that by Stool; therefore a Man will be made no weaker by having Ten Times as many Stools as he us'd to have, than he will be by perspiring only double the quantity he does at other times; further, if we consider that the greatest part of our Stools are the remains of our Food that cou'd not enter the Lacteals, we shall find the difference much greater; for we can't imagine that above one Tenth of that we void by Stool, is evacuated from the Mass of Blood, by the *Liver*, *Pancreas*, and *Intestinal Glands*; so that upon this account there is as much deriv'd from the Mass of Blood in one Day by Perspiration, as by Stool in a 100; therefore if Perspiration by any means be doubled, in 24 Hours it will make a Man as faint as if he had 100 Times more Stools in the same time than usual. And there is none but who expect a weakness from an unusual Purging, and we daily Experience the sudden danger of a *Diabetes*, wherein the quantity of Urine

(c) Medicin. Statica, *Aphor.* 59. § 1.

is

is encreas'd, but take little notice of an encreas'd Perſpiration, becauſe *inſenſible*, for which reaſon we are apt to aſcribe the miſchief it occaſions to ſome other Cauſe.

A Conſumptive Gentlewoman in *Sheffield*, by the advice of a Phyſician, putting on a Flannel Shift, tho' ſhe was able very well to walk about the Houſe, in two Days Time was confin'd to her Bed (from whence ſhe never roſe) without any other evident Cauſe than wearing Flannel.

If what I've ſaid be of force enough to perſwade any to leave off wearing it, I wou'd adviſe 'em to do it in a warm Seaſon, and at the ſame time, either make uſe of the Cold Bath, or the *Fleſh Bruſh*, which will prevent the Inconveniences that otherwiſe wou'd attend it.

I was perſwaded to wear Flannel next my Skin, above ten Years ago, for a ſevere Cough that I had got; by which, I think, I receiv'd ſome advantage, but after I had worn it a Year or two, I found it very troubleſome and prejudicial to my Health; it made me ſo exceeding tender, that I was not able to bear the leaſt Cold; and

I found by the Experiment of leaving it off, how much it disposd me to faintness, which I mightily suspected before, and therefore I attempted several times in vain to get quit of it, but cou'd not without some inconveniency, greater than I was willing to bear, till about two Years since, in a Hot Season going into a Cold Bath, I left it off without any damage.

CHAP.

CHAP. VIII.

Of Meat.

§ 1. AN Animal Body wou'd be little better than a clod of Earth, were it not for the vaſt variety of Action, 'tis enabled to perform, and this it does by means of an infinite number of ſmall contractile Fibres, which in every contraction and diſtraction, which are Millions in a Day, by their attrition one againſt another, file off from one another vaſt numbers of little ſeparable Parts, by which the Fibres daily grow weaker, and wou'd ſoon be unfit to perform their function, were they not as conſtantly repair'd as they are diminiſh'd. And whenever the Fibres are in a ſtate of relaxation, their Pores being open'd, then are they in the fitteſt condition to have new Matter by the force of the circulating Humors impacted to them, and in this condition are the Fibres when the Animal is a ſleep. So that as waking is the time of ſpend-

ing, ſo is ſleeping the time of recruiting, hence by the by we may obſerve the neceſſity of ſleeping.

§ 2. Now 'tis our Food, whether Fluid or Solid, that furniſhes us with this ſupply, and all that is neceſſary to qualify it for this purpoſe, is only that it be by the force of the *Stomach* and *Lungs* divided into parts ſmall enough to enter the *Poruli* of the decay'd Fibres.

Hence we may deduce the neceſſity both of taking in Food, and alſo of the circulation of the Blood, for if either of theſe were wanting, there would be no means left of repairing the loſs the Fibres ſuſtain by their daily contraction.

So that if a Man wou'd not deſtroy his Health, his Exerciſe ſhou'd be proportion'd both to his Eating and Sleeping: And Mr. *Fuller* in his *Medicina Gymnaſtica*, (tho' in other reſpects it be an uſeful Book) is mightily out of the way in preſcribing Exerciſe, and that violent too, without any diſtinction to all ſorts of People that can but bear it, nay tho' they cannot without being extremely tir'd. I ſhould have referr'd this to what I ſhall ſay about Exerciſe, but that it follows ſo naturally from what

what I have but just now advanced.

§ 3. Now that we might not neglect a supply so necessary to the Preservation of our Body, the bountiful Author of our Being and Happiness, hath furnished us with two Appetites, the one to Solids, which is called *Hunger*, the other to Fluids, which is called *Thirst*, what they are is better known by Experience, than by the best Definition, and as they are a *Stimulus* to the gratifying of Natures cravings, so would they be the surest Guides both as to the Quantity and Quality of what we either Eat or Drink, were it not that most Men have vitiated and debauch'd them by Irregularity and Excess. Our Skill in the Animal Structure is not such as to determine exactly either the Quantity or Quality of what we take into the Stomach, so as best to answer the end of Eating and Drinking.

Tho' *Sanctorius* (*a*) gives a Rule to measure that quantity of Food, which is best suited to our Health, *viz.* 'Observe in the Morning, after a some-

(*a*) Medicin. Stat. *Aphor.* 64. § 1.

'what plentiful Supper over Night; 'what the Perſpiration in the ſpace of 'twelve Hours comes to, ſuppoſe it 'comes to fifty Ounce; then another 'Morning, after faſting over Night, but 'with this Condition, that thou didſt 'not exceed at Dinner the Day before, 'make the ſame Obſervation, as ſup-'poſe the Perſpiration to have amount-'ed to twenty Ounce; ſo having made 'theſe Obſervations, pitch upon that 'proportion of Meat and other *Non-'Naturals*, as may reduce the Perſpirati-'on to a mean between fifty and twen-'ty Ounce, and that will be thirty five 'Ounce, and that is the quantity ſought 'for. This *Aphoriſm* is ſo far from be-ing an unerring Rule that 'tis faulty in ſeveral Reſpects, for the ſame quantity of ſome ſorts of Meat and Drink, will almoſt expel double the quantity of Per-ſpirable Matter, in the ſame time, that other ſorts will do it in.

In the next place ſome Perſons, in or-der to their Health, ſhould perſpire ve-ry freely, and others more ſparingly, according to ſeveral of his own *Apho-riſms*, ſo that after all we muſt have recourſe to ſomething elſe as our Direct-or, in this momentous Affair, and that

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can be nothing but the two recited Appetites, which as they direct us in the quantity, so should they be the Measure of what quantity we either Eat or Drink. And in general so much may we Eat or Drink, till Hunger and Thirst be no longer troublesome to us, for whenever we exceed these bounds, we sow the Seeds of various Distempers, but yet as *Hippocrates* (*e*) tells us, the consequents of a slender Diet, are more fatal, then of one that is more plentiful, wherefore 'tis dangerous for one in Health to live of too spare Diet.

§ 4. It is not only in this state of Health we are so much oblig'd to our Appetites, but even in most Distempers; were we to consult 'em, we should find 'em very good Guides, tho' not infalible. In *Inflammatory Fevers*, what more desirable than cooling Liquors? and in general nothing more beneficial. Or, what more detestable than *Cordials*, *bitter Alexipharmics*, and *testatious Powders*, such as *Coral*, *Pearl*, *Gascoine*'s *Powder*, &c. and nothing more prejudicial? In *Hypochondrical* Cases the Appe-

(*e*) *Aphor.* 5. § 1.

tite

tite is oftimes Vorations, and Thirſt little or none at all: And nouriſhing Food in good quantity is one of the beſt Remedies for this Diſtemper. And as their Drink is but little, ſo would they have it to be Strong and Spirituous, both advantageous to the Hypochondrical. To produce all the Inſtances I could for the confirmation of this Truth, wou'd be to give a Hiſtory of moſt Diſtempers; but ſhall ſave my ſelf the Labour, by appealing to the experience of every Judicious Phyſician.

§ 5. Our Food is to be conſider'd with Reſpect to its quantity, its quality, and the times of taking it.

In the firſt place, 'tis more ſafe to exceed a little in the quantity, than to come ſhort, as appears by the laſt recited *Aphoriſm* of *Hippocrates*, as alſo from ſeveral others of * *Sanctorius*. And indeed the damage of a more full Diet, is ſoon remedied either by Exerciſe, or gentle Evacuations, but the decay of Strength, the natural Conſequent of too ſpare a Diet, is not ſo eaſily repair'd.

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* Vid. *Aphor.* 15, 16, 32, 33, 40, and 44.

I am not here pleading for Gluttony, that being attended with the worſt of conſequents, only wiſh that what I've ſaid may be a caution to thoſe, who from the various Hiſtories they meet with of ſuch as have lived a long time by a ſpare Diet, are inclin'd to ſet upon the like practice; the Miſchief of which I've more than once obſerv'd. And in general thoſe Inſtances, as they are but few, ſo are they of ſuch as liv'd Unactive and Solitary Lives, the waſt of Spirits being but little, their ſupply need but be anſwerable to it. Tho' People who live of a ſpare Diet, are unfit for the fatigue of Buſineſs, or any hard Labour, yet ſuch People if their Exerciſe be not too great, live longer than thoſe of a robuſt Conſtitution; and it is obſerv'd that Men of a pale Complexion, live longer than thoſe who have one more Florrid, and with a low Pulſe than with one that is ſtrong; the reaſon is plain, for the Humors of the laſt ſort are more *Volatile*, and ſo more ſuſceptible of any Impreſſion from external Agents: Their Solids alſo being more Tenſe and Rigid, will upon all occaſions make their Vibrations more quick and ſtrong, and ſo diſpoſe the Body to all ſorts of

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Inflammatory Diſtempers; beſides, being more ſubject to break by their greater Tenſity, they will be liable to a more ſpeedy decay by their greater Motion.

§ 6. They who uſe moſt Exerciſe ſhould eat and drink moſt plentifully, by § 1. which ſhould therefore be a caution to Men of a ſedentary Life, how they indulge themſelves either too much in eating or drinking, tho' when the *Meninges*, together with other Membranes, have been upon the ſtretch too long by intenſe and ſevere Study, a Glaſs of ſome Spirituous Liquor *ad Hilaritatem* in pleaſant Company, is ſo far from prejudicing the Health, that 'tis attended with great Advantages; for beſides the promoting Perſpiration which was ſuppreſs'd by the foregoing Study, the over-Tenſe Fibres are relax'd, and ſo capable of having that loſs repair'd they had ſuſtain'd by a long continu'd contraction.

§ 7. On the other Hand, Gentlemen, that indulge to the greateſt exceſs, both in eating and drinking, can uſe no better Antidote againſt the inconveniences that otherwiſe wou'd attend 'em, than violent Exerciſe, if their Strength be ſuch

ſuch as can bear it, and for this reaſon 'tis, that ſome Gentlemen Fox-hunters ſurvive ſo many of their drinking Companions who do not uſe the like Exerciſe, the Fibres being ſo mightily relax'd both by the quantity and ſpirituouſneſs of the Liquor they drink (for Drunkenneſs is attended with all the Signs of a general relaxation, as ſtammering in the Tongue, ſtaggering in the Limbs, relaxation of the *Cornea*, dilatation of the *Pupil*, &c.) will diſpoſe the Body to *Dropſies*, the *Jaundice*, *Conſumptions*, *Apoplexies*, *Palſies*, &c. (as appears by comparing the Theory of theſe Diſtempers with a general relaxation) if theſe conſequences be not prevented by reſtoring the Fibres to their former Tone again, which nothing is ſo likely to accompliſh as violent Exerciſe. I ſhall add no more to what I have ſaid on this Head, leſt I ſhould anticipate what I have to ſay in the Chapter of Exerciſe.

§ 8. *Hippocrates (f)* tells us, That the Aged require leſs Food than thoſe who are younger, or in the flower of their

(f) *Aphor.* 13. § 1.

Age,

Age, and it was to the putting of this Obſervation in Practice, that the famous *Italian Cornaro* (Yearly leſſening the quantity of his Food as his Age advanced) imputes in a great meaſure, both his Health and *Longævity*, being in good Health at the Age of 120.

The Healthful alſo require more Food than the Sickly, as the Strong do more than the Weak, for the more we nouriſh diſtemper'd Bodies the more damage we do 'em, (*g*) and yet ſome Diſtempers do not only require a nouriſhing Diet, but that it ſhould be adminiſtred in great quantities too if the Stomach will bear it, as the *Hypochondrical* Diſeaſe, a beginning *Dropſie*, and in all Caſes where the Pulſe ispreternaturally weak and ſlow, provided Exerciſe be not neglected at the ſame time; a ſpare Diet is more proper in *accute* Diſtempers than *Chronical*, and it muſt be moſt ſlender when the Diſeaſe is at its height. (*h*) So muſt it alſo be in the Paroxiſms of intermitting. (*i*) As to the quantity, take the following Rules.

(*g*) Hipocrat. *Aphor.* 10. § 2.
(*h*) *Aphor.* 8. § 1.
(*i*) *Aphor.* 11. § 1.

§ 9.

§ 9. The quantity is always too much when it so distends the Stomach, as 1st. to cause uneasiness, and then by pressing upon the *Diaphragm* and the descending Trunk of the *Arteria Magna*, and the ascending Trunk of the *Vena Cava*, to give a difficulty of Breathing, and obstruct the passage of the Blood through these Vessels, and thereby forcing a greater quantity than ordinary into the Head, so distends the Arteries, as in a great measure to obstruct the passage of the Spirits thro' the contiguous Nerves, by which the Man becomes listless and sleepy.

2. A Man in perfect Health ought always to rise from the Table with some Appetite.

3. If either the Body or Mind be less fit for action after eating, than before; that is, if the Man be less fit either for Labour or Study, he hath exceeded in the quantity.

§ 10. Our Food, as to its quality, is either from the Animal or Vegetable Kingdom, 'tis either more or less Nourishing, either Solid, or Fluid, Simple or more Compounded.

§ 11. That taken from Animal Bodies seems best qualifi'd for the recruiting of diminish'd

diminiſh'd Strength, and repairing the loſs our Fibres ſuſtain by daily motion, conſiſting of Parts which have heretofore been apply'd to the ſame Uſe: Whereas our Vegetable Food muſt be converted into Nouriſhment, by the proper action of our own *Stomach* and *Lungs*, which are much weaker than thoſe of divers Animals we furniſh our Tables with every Day; being the Solid Parts of an Animal are the very Matter with which they were nouriſh'd, amaſs'd together in a Solid Form, and the nouriſhment of an Animal is but a little part of that Vegetable Food he lives on, as appears by the vaſt quantity of Excrements which are voided by ſuch Creatures, therefore the ſame quantity of Fleſh-Meat affords much greater Nouriſhment than Vegetables do. That it does ſo, is confirm'd by this Obſervation, that all Animals which live upon Fleſh-Meat as they eat leſs, ſo are they much ſtronger, and oftentimes more ſagatious.

If an *Engliſh* Man eat a Pound of Beef at a Meal, a *Dutch* Man, who moſtly lives upon Vegetables, will eat two Pound of Cabbage or Turnip, and yet be no ſtronger nor near ſo active as the *Engliſh* Man: Beſides this, whatſoever

ever is apply'd to any part of our Body for Nouriſhment, muſt be of a Volatile Alkaline Nature, as is evident from various Experiments upon the Blood, all which ſhew it to be fraught with *Alkaly Salts*, whether it be in a ſound or ſickly State; for the Solution of *Sublimate*, curdles the *Serum* white, filings of *Copper* turns it in a Days time *Cæruleous*, *Syrup of Violets* and the Solution of *Turnſole* change it to a green, all ſigns of a predominant *Alkaly*. A diſtillation of the Fibres themſelves afford an *Oyl*, *Volatile Spirits* like that of *Hartſhorn* and *Volatile Salt*. So that what Food ſoever is neareſt allied to the Juices that nouriſh us, and affords the greateſt quantity of theſe Principles, is fitteſt for that purpoſe. Now there is nothing bids ſo fair for this Character as Fleſh-Meat, Gellies, Broth, Soops, *&c* all which afford a great quantity of an Oily Alkaly: On the contrary, Vegetable Food as it is more Viſcid, and ſo requires more labour of the Stomach to render the parts of it ſo ſmall as to enter the *Lacteals*; ſo is it ſtock'd with *Acid* Particles, which muſt be converted into *Alkaly* by the force of the

Stomach, *Lungs* and *Heart*, before it be fit for Nouriſhment.

§ 12. *Bread*, as it is the moſt Univerſal, ſo 'tis the moſt Nouriſhing of any ſort of Vegetable Food, and 'tis more or leſs ſo according to the Grain 'tis made of, the different way of preparing it, and the time of keeping it before it be eaten. That made of Wheat is moſt Nouriſhing, eſpecially if it be well freed from the Bran, but then 'tis digeſted more difficultly, and enclines them that eat it to be Coſtive, but if it be mix'd either with Rye or Bran, it looſens the Belly: Few Stomachs can digeſt it *Unfermented*, tho' ſome hard Labourers conſtantly eat it ſo. The better our Bread is Fermented the eaſier it is to be Digeſted, for a great deal of that is done by Fermentation, which otherwiſe might have been done in the Stomach by *Triturition*; for as Digeſtion is nothing elſe but the reduction of our Food into parts ſmall enough to enter the *Lacteals*, ſo the work of Fermentation is only an intimate diviſion of the Fermenting Maſs, whereby the *Coheſion* of its parts is leſſened, and ſo becomes leſs Viſcid, and eaſier converted into Chyle in the Stomach. 'Tis alſo more diffi-

difficult to digeſt Bread that is New, than that which is a Day Old, for the very ſame reaſon; the New being much more Viſcid than the Old, and 'tis upon this account Panado's and Puddings made of Bread, agree better with weak Stomachs, than ſuch as are made of Meal. I think it proper enough in this place, to take notice of the pernicious Practice of many who feed their Children with Milk Pottage, boil'd till it be almoſt as glutinous as Syzing; 'tis no wonder that ſuch Children have windy Diſtentions of the Belly, ſometimes Purge, and at other times are Coſtive, are troubled with the Gripes, and ſometimes with Convulſions: Thoſe Diſorders are often better remov'd by an alteration of their Diet, than by any Medicine.

The Grain that is moſt in uſe is Wheat, Rye, Barly, Oats, Peaſe and Beans, (Rice is ſeldom us'd among us, but on a Phyſical account, in order to bind the Belly, but oftentimes very improperly, being ſo difficult to digeſt,) they only differ in their being eaſily or more difficultly digeſted, and in affording more or leſs Nouriſhment.

Wheat it preferrable to the reſt, in both reſpects, yet Rye, Oats and Barly are good Food, eſpecially if well prepar'd; Peaſe and Beans are too Viſcid, whereby they become windy, and offend the Head and Stomach.

This ſort of Food, except when it proves too Windy, is proper for Perſons of a robuſt Conſtitution, whoſe Fibres are too Tenſe, and whoſe Blood abounds too much with Alkaly Salts, for they all afford, in Diſtillation, a conſiderable quantity of Oyl and Acid. Upon which account they are fit to ſoften and relax the over Tenſe Fibres, and alſo blunt and correct the Acrid, Alkalious Salts in the Blood: So that 'tis very uſeful in the *Scurvy*, *Leproſie*, and moſt other *Cutaneous Diſtempers*; 'tis alſo proper for thoſe who are ſubject to inflammatory Diſtempers, as *Pleuriſies*, *Rheumatiſms*, or *Effervescences* of Blood, flushing *Heats* in the Face, or other Parts, the periodical *Aſthma*, &c. Salads and Roots, of the cooling ſort, and Sub-acid ſweetiſh Fruit, which I need not name, being known to every Body, have pretty near the ſame Vertue, excepting that ſome of them are too flatulent to be

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uſed with ſafety by Men of weak Stomachs.

The hot Salads and Roots are moſt proper in thoſe Caſes, where Fleſh-Meat is beneficial; as 'tis in all Diſtempers where the Blood is too *Serous*, the *Motion too ſlow*, and the Fibres too *lax*.

§ 13. I've known Preparations from Fleſh, even in ſlow Fevers, more uſeful than the moſt generous Cordials the Shops could afford. The firſt time I uſed 'em in this Caſe, was upon my ſelf, when, after I had been ten Days in a Fever, was ſeiz'd with ſuch frequent fainting Fits, that my Life was in hazard every Day, tho' I took a great variety of Cordials, which always refreſh'd me for the preſent, but their force were ſoon ſpent, and my Fits return'd ſo often, that I was almoſt conſtantly drinking of my Cordials, till after a Day or two I reſolv'd to try ſome good Chicken Broth, which, in little quantities, agreed well enough with my Stomach, and relieved me much more than my former Cordials. This encourag'd me, my faintneſs continuing, tho' not ſo dangerous, to have it ſtronger, till at laſt it was as ſtrong as

Mutton, Veal and Chicken, boil'd together, cou'd make it, and of thoſe I took a Porringer every two Hours, for twenty Days together, which was ſo far from heating me, or cauſing any uneaſineſs, that I complain'd of nothing during all that time, but my exceſſive weakneſs: Notwithſtanding which, I aroſe from my Bed every Morning, tho' with the utmoſt difficultly; without doing this, I verily believe I had loſt my Life, tho' I uſed all other rational Methods that were ſuggeſted to me. The reaſon why lying too much in Bed in great weakneſs is ſo prejudicial, I ſhall account for in a more proper place, but ſhall, before I conclude this Hiſtory, obſerve to you, that of all the Cordials I try'd during my Fever, nothing reliev'd me ſo much as the *Cortex*, neither were the effects of any Cordial near ſo durable. This ſucceſs immediately upon my recovery, encourag'd me to try the ſame method with a young Gentleman, who, by the advice of one, who underſtood very little of his Caſe, was, in two Days time, twice Blooded, Vomited, Purg'd, Sweat and Bliſter'd, which had ſo infebled him, that he cou'd ſcarce ſpeak or turn him in his Bed, his Pulſe was

ſlow and exceeding weak, and ſometimes intermitting, his Urine pale, his Tongue cover'd with a Mucous Matter, yet not Thirſty; and all this brought about in two Days time: For when he was firſt ſiez'd, his Fever was very acute, with all the ſuitable Symptoms of Thirſt, Heat, Pain in the Head, *&c.* by eating plentifully of good Broth, and the interpoſition of ſome gentle Cordials, in a few Days time he was free'd from all his dangerous Symptoms, and after that treated ſuitably to his Diſtemper, of which he recover'd: But juſt upon his recovery, was ſiez'd with violent *Pleuritick* Pains, and I being out of Town, by the advice of another, was twice Blooded and confin'd to Water-gruel, by which means, tho' his Pain was never a whit abated, his Strength was mightily diminiſh'd, his Pulſe was ſoft, weak and ſlow, which in a true *Pleuriſie*, is always *hard* and *quick*, therefore gueſſing the Pain to be owing to the Viſcidity of the Blood, and the deficiency of the Spirits (whereby the Heart was diſabled from contracting with that force, which was neceſſary to carry on the circulation, ſo that its difficult paſſage through the

Capillaries in the Breaſt, was the occaſion of that pain) rather than to either the too violent motion of the Blood, or the too great Tenſity of the Solids (which muſt rather have been in a lax Condition at the end of ſuch a Fever) therefore inſtead of purſuing the common Methods, I return'd him to his nouriſhing Diet and Cordials again, by which means in a little time his pain was abated, and in twenty four Hours had quite left him, and then he recovered without any Relapſe. I think thoſe two Inſtances ſufficient to ſhow that all the ends of Medicine are not to be obtain'd only by the uſe of *Drugs*, but if we wou'd ſerve our Patients in their greateſt Exigencies, we muſt ſometimes tread an unbeaten Path, but never without a truſty Guide to direct us, *viz.* Mathematical Reaſoning founded upon unconteſted Experiments It is paſt doubt with me, whatever ſome Phyſicians ſay againſt *Theory*, which they don't underſtand, that 'tis not only uſeful, but a neceſſary Qualification of a good Phyſician. For one that underſtands the Structure of a Humane Body, the nature of the Solids and Fluids, the manner how Animal Actions are performed,

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the Nature of *Secretion*, the effect of either encreasing or lessening any Evacuation, the known Laws of Motion as apply'd to *Mechanics*, and *Hydrostatics*, with the application of 'em to the alterations made in Human Bodies, is *Cæteris paribus* better qualified for a Physician, than one who is Ignorant of these things, as too many who bear a great Character in the World are, which for want of solid Reasoning, they maintain by a supercilious Look and affected Gravity, whose Word ought no sooner to be taken for the safety of any Medicine they prescribe, (for the Prescription of which they can give no reason) than that of a *Mountebank* upon his *Stage*, who will never fail of telling the People how many hundred he hath cured in all Distempers.

I wou'd not be mistaken in the foregoing History, as if I commended a nourishing Diet in all Fevers, whereas I think it dangerous in ten to one, wherein 'tis beneficial; and even in those where 'tis proper, 'tis not so in every *Stadium* of the Distemper. The more *Acute* the Distemper, the more slender the Diet, and *Hippocrates* tells us, That

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a moist Diet is proper in all Fevers, especially for Children. (*k*)

§ 14. It is a great mistake to think that the Stomach will always digest Food that is Liquid, better than that which is Solid, since it is contrary to daily experience, tho' in general that Notion is true, but in many Distempers 'tis otherwise, nay in the same Distemper Liquids agree with one Man, and Solids with another: But to determine when to prescribe the one or the other sort of Food, besides the Patients own Observation what is easiest to his Stomach, which is never to be slighted, this is the Rule. Whenever the Fibres of the Stomach are too lax, and its Cavity and Lining too much stuffed with a *Viscid* Slime, then is Solid Food more proper than that which is Liquid. On the contrary, when the Fibres are too Tense and Springy, and the internal Coat of the Stomach rob'd of its Slimy *Mucus*, then are Liquids more proper than Solids: The Pulse, the Urine, and especially the Spittle, give very probable Conjectures, in what condition it is in those respects.

(*k*) *Aphor.* 16. § 1.

§ 15.

§ 15. Tho' compounded Food be very Delicious, and better fitted to gratify the craving of a luxurious Appetite, and ſuit the nicety of a weak or deprav'd one, for which Reaſon it may ſometimes be allow'd, yet it is ſeldom or never ſo wholeſome as that which is more ſimple, provided it be of eaſie Digeſtion, and afford good nouriſhment. For the different degrees of Coheſion there are in the Ingredients of which *made Diſhes* are compounded, muſt needs make the Digeſtion, or in other Words, the diſſolution of our Food into ſuch parts as are ſmall enough to enter the *Lacteals*, more difficult.

§ 16. As to the times of taking Food I ſhall conſider 'em in reſpect to their Number in 24 Hours, and as to their ſeaſonableneſs.

§ 17. It is the Cuſtom of ſome to Eat once, ſome twice, and ſome three times a Day; now the number of times a Man ſhou'd Eat in a Day is to be determin'd by the Age, Strength, Appetite, quantity of Food he takes at a time, its quality as to its eaſie or hard Digeſtion; for the Young, the Weak, and thoſe who take but little quantities at a time, of Food that is eaſily digeſted, ſhould

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Eat oftner than thoſe who are of full Age, Strong, of a Voratious Appetite, who Eat great quantities at a Meal of Food, which is difficultly digeſted. Every Man ought to Eat ſo often as is neceſſary to ſupply the loſs he Daily ſuſtains, by the motion of his Muſcles, ſo that they who have little Appetites, ſhou'd uſe but little Exerciſe, or Eat often; for if Eating once a Day will not ſupply our daily Expence, we muſt Eat twice, and if that be alſo defective, we ſhould Eat three times a Day. The Signs of too long abſtinence are, after Hunger, a Faintneſs with a peculiar uneaſineſs about the Heart-Pit, a low and ſtringy Pulſe, a weakneſs in the Joints, inconſtancy of the Mind, and if it be continu'd yet longer, will bring on dangerous Symptoms, as *Lypothymies*, *Vertigo's*, *Epilepſies*, &c. the laſt of theſe I obſerv'd to happen to a Gentleman, by too long Abſtinence, join'd with trouble of Mind, from his Misfortunes in the World; for as I was Riding with him at five in the Afternoon, having Eat nothing all that Day, and very little for ſome Days before, fell from his Horſe in a violent Epileptic Fit, having never had one before in his Life, nor ever

ever since but once upon the like occasion; I got him into a House hard by, and by forcing some hot Ale into his Stomach brought him ought of his Fit, and then perswaded him to Eat some Victuals, and drink a Glass or two of Ale after 'em, by which he was mightily refresh'd, and recover'd without any other Medicine. And indeed nothing is more proper in such a Case whereby Abstinence, together with intense thoughtfulness all the Fibres of the Body were wonderfully contracted, and their *Elater* prodigiously encreas d, than what wou'd cause a general relaxation, as Spirituous Liquors of all sorts do, first in the Stomach, and then in the rest of the Body; so that Ale, for want of other Cordials, became an excellent Medicine.

§ 18. There are some who do not only repair their daily loss by one Meal in 24 Hours, but encrease the bulk of their Bodies to a vast extent, as we may observe in some fat People; and I doubt not but that 'tis best for such to eat seldom, for more Reasons than only to prevent their further feeding.

§ 19. But in general 'tis best to Eat twice a Day, at such convenient distances

ces as that the Food taken at one time may be Digeſted before any more be Eaten. In order to determine this Matter, I ſhall obſerve what happens upon Eating plentifully, as alſo upon long Abſtinence, even where the Stomach is not loſt, but more Voracious.

§ 20. Hunger, as all uneaſie Paſſions do, puts all the Body into a contracted State, as Eating on the other Hand relaxes it, and the relaxation is always proportionable to the pleaſure of Eating, and this in proportion to the Hunger: So that thoſe who faſt till they be the moſt Hungry, as their Veſſels are hereby the moſt contracted, ſo will they upon Eating be the moſt relax'd, all Secretions being nearly ſuppreſſed in the firſt Caſe, and mightily encreas'd in the ſecond (*by the 17th Propoſition of Secretion*) the Veſſels being more Tenſe in ſevere Hunger, their Vibrations will be ſmarter, and part of the ſubſtance more eaſily worn off, and ſo diſpoſe ſooner to old Age, the relaxation upon Eating being alſo greater than ordinary, would in ſome Meaſure compenſate for the loſs by giving Liberty for the application of nouriſhment to the worn Fibres, but that the time is improper, the

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Succus Nutritius of the preceeding Meal being all ſpent, and that of the preſent being yet in the Stomach, this relaxation, tho' very great, will be of little uſe.

'Tis certain, that upon this greater relaxation when the Stomach is cramb'd with Meat, 'tis leſs fit for Digeſtion; for the force of the Stomach upon a little, is greater than 'tis upon a greater quantity of Food, and therefore a great quantity is more difficultly Digeſted than a little, and the Fibres being weaker by relaxation, is even unable to Digeſt a moderate quantity, and for this reaſon 'tis, that a healthful Man ought to riſe from his Table with ſome Appetite.

Thus the Digeſtion being weaker, the Chyle will be more Viſcous, the motion of it through the *Duodenum* ſlower, and the Orifices of the *Lacteals* wider, by the ſuppos'd relaxation; upon all which accounts, a more Viſcid Chyle will be carried into the Maſs of Blood, which generally requires more labour to make it Fluid and fit for Nouriſhment, than they are able to bear who eat but once a Day.

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This greater quantity of Food, when 'tis well warm'd in the Stomach, will ſwell and rarifie it ſelf, and that the more too, becauſe the relax'd Fibres of the Stomach are not able to reſiſt it, and ſo cauſe a windy Diſtention of the Stomach with ſome uneaſineſs at leaſt; whereby Perſpiration is ſuppreſs'd as well as by an empty Stomach, (*l*) which is more or leſs inconvenient, tho' Cuſtom may make it undiſcernable: For I know ſeveral who eat but once a Day without any apparent Prejudice, which yet may be the means of ſhortning their Lives, tho' it ſeems not in the leaſt to impair their Healths at preſent.

Beſides this a great quantity of Chyle being power'd into the Maſs of Blood at once, and that but ſeldom, muſt needs make a great alteration in the Body, and put the Inſtruments of *Sanguification* more upon the ſtretch, than when a little quantity is pour'd in more frequently.

§ 21. I have obſerv'd before, that the times of Eating ought to be ſuch, that the former Food may be digeſted be-

(*l*) Vid. Sactor. *Aphor.* § 3.

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fore more be eaten, and it ſhou'd be alſo at ſuch diſtance from Bed-time, that Digeſtion be nearly finiſh'd before we Sleep, for the preparation of our Food by the Stomach, and the application of it to nouriſh the Body, are Actions ſo vaſtly different, that they are inconſiſtent one with another. Digeſtion is perform'd by contraction, as Nutrition is by Relaxation, ſo that the Food ſhou'd be digeſted before the Fibres be relax'd in order to their Nouriſhment; beſides Sleeping immediately after Eating, as it makes a more Viſcid Chyle, ſo does it derive more of it than ordinary into the Maſs of Blood, thro' the enlarged Orifices of the *Lacteals*, and conſequently produces all the ill effects that we may expect from the Blood when too Viſcid.

§ 22. As to the moſt ſeaſonable times of eating in general, they are about three Hours after riſing in the Morning, and four or five before going to Bed, as appears by comparing ſeveral *Aphoriſms* of *Sanctorius*, viz. 57. § 1. the 20, 28, and 35. § 4.

The Body, upon waking, being put into a contracted ſtate, if there be any remains of the laſt Meal either undi-

geſted in the Stomach, or not ſufficiently attenuated in the Veins and Arteries, or adhering to the Orifices of the Excretory Veſſels, will, if not diſturb'd by eating or drinking, ſo encreaſe the celerity of the Bloods motion, and the Vibrating force of all the Veſſels, as both to digeſt the remaining Food, attenuate that which is too Viſcid, and expel that which lies at the Orifices of the Glands. And when theſe ends are once compaſs'd, then 'tis the fitteſt time to eat again, and this commonly happens between three and four Hours after riſing, Perſpiration (being the moſt plentiful two Hours after ſleeping by the laſt *Aphoriſm*) ought by no means to be diverted by eating: So that we ought not to eat till after this time, according to my Aſſertion, tho' 'tis true that the difference of Conſtitutions, together with the different way of living ſome have from others, make ſome alteration in this reſpect.

If we go to Bed before our Meat be digeſted the Stomach will be diſturb'd in the performance of its Orifice, by that general relaxation that will happen upon ſleeping, and all the ill conſequents taken notice of in the laſt §. will enſue.

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The times of Eating ſhould be different to thoſe that drink a Bottle every Night; for their Victuals ought nearly to be digeſted before they drink, or elſe their Suppers ought to be very ſlight, and of ſuch Food as eaſily digeſts, and yet Solid rather than what is Liquid; for a Reaſon I have more than once given in this Chapter.

CHAP. XI.

Of Drink.

§ 1. *Water* is the principal Ingredient in all our Drinkables, and the purer or leſs mixed we find it either with Vegetable, Mineral, or earthy Particles, the better it is. It's purity is beſt known by its Tranſparency, its fluxility, inſipidneſs, and lightneſs; for there is no mixture but what will alter it in ſome of theſe reſpects, and as that Water is the wholſomeſt, which has the leaſt number of forreign Particles mix'd with it; ſo there is none but what has ſome, as appears from Dr. *Woodward*'s Experiments upon Vegetation; and 'tis from this mixture that 'tis liable to ſtink and decay upon its Stagnation, for theſe Particles being of different Gravities, will ſome ſubſide, whilſt other emerge, and by their contrary Motions ſo break and divide themſelves, as ſome of 'em to become ſpecifically lighter than the Air, and in their elevation ſtrike the

the Noſtrils with an ungrateful Smell, which when ſpent in the Air, and the reſt of the ſolid Matter that was contain'd in the Water ſettled in its proper place, the Water becomes ſweet again, as we know by Experience. Rain-Water is the freeſt from Mineral Particles, but well ſtock'd with Vegetable, which is the reaſon that it ſo ſoon putrifies, otherwiſe it would be the moſt wholſome of any: But Spring Water, tho' it be heavier than Rain-Water, yet being leſs apt to putrifie, is certainly fitter for common uſe, provided it will bear Soap, and the Fountain run with a ſtrong Current.

Cor. 1. From what hath been ſaid, it appears of what dangerous conſequence the *Stagnation* of our Waters wou'd be, and how kind Providence hath been to us by the *attractive* force of the Sun and Moon, to make ſo violent an agitation in the Sea-Water twice in every twenty five Hours, as we obſerve upon the flowing of the Tides. And Tempeſts, tho' prejudicial to the Mariners, yet ſeems neceſſary for the better obtainment of this end; for without Storms and Tides the *Ocean* in a little time wou'd be ſo corrupted, as both to Poiſon the Fiſh,

and alſo infect the Air, with ſuch quantities of putrified *Effluvia*, as in a little time would kill the Land Animals alſo.

Cor 2. That our Water is fitteſt for uſe, after it hath ſtood ſome time in a cool place to ſettle; the Earthy Mineral Particles will ſome of 'em fall to the bottom of the Veſſel, and the Water become more Clear and Light.

Cor. 3. That Water ſhould not be much boil'd before uſe, as many do for the making of Tea and Coffee, for tho' boiling may promote the ſeparation of any *Heterogenious* matter from the Water, if it ſtand ſome while after to ſettle; yet by Evaporating the lighteſt, and therefore the beſt part of it, what remains muſt be ſo much the worſe, and moſt Water may be boil'd till it have a Saltiſh Taſt.

§ 2. It is ſo neceſſary to our Subſiſtence, that we cou'd not live a moment without it, 'tis this Element that furniſheth all the Fluid part of our Humors, without which they could not circulate, and that diſſolveth all the Salts in the Blood, whereby ſome are carried to their proper places within the Body, and others to proper *Emunctories* for their expulſion from it. It ſerves to prepare

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our Food, and then for a *Vehicle* to convey both it and Medicines out of the Stomach into every little Meander of the Body, both for Health and Nourishment.

§ 3. *Milk*, *Ale*, and *Wine*, are nothing but certain quantities, tho' in different proportions, of *Salts*, *Sulphurs*, and *Earth*, swimming in pure Water; the difference between *Fermented* and *Unfermented* Liquors consists in nothing but the different proportion of the *Earthy* Particles, and subtilty of the *Sulphureous* and *Saline* swimming in Water; for from *Must* or the unfermented Juice of *Grapes*, or from a decoction of *Malt* before Fermentation, may by Distillation be extracted great quantities of Oil, and the *Caput mortuum* will be considerably more than after Fermentation, but when by Fermentation (which is only a violent agitation in any Liquor whereby the *Cohæsion* of the parts is alter'd, and those which are too heavy to swim in the Liquor sunk to the bottom, and such as are too light forced up to the top,) the *Sulphureous* and *Saline* parts are Volatilized, that which before was Oil and essential Salt, now upon Distillation arises under the form of Spirits, and Volatile Salt, so that Spirit

is nothing but Oil and Salt ſubtiliz'd, or whoſe parts are exceedingly divided, the pungency of Spirits upon the Tongue is owing to the ſharp Salts now ſet at liberty, which were ſheathed before in the Viſcid parts of the unfermented Liquor.

§ 4. In all Caſes wherein too many Salts abound in the Blood, ſuch as the *Itch*, *Scurvy*, *Leproſy*, &c. unfermented Liquors (if cautiouſly uſed) are the moſt proper, as they alſo are for ſuch who are ſubject to *Inflammatory* Diſtempers, as *Pleuriſies*, *Rheumatiſms*, or the like. When we deſign to *Relax* by Water drinking, we ſhould take it warm, if not hot, with the Infuſion of ſome Drug or other in it, to encreaſe its relaxing Virtue, ſuch as the Roots of *Sarſa*, *China*, *Liquorice*, *Althæa*, &c. It may be mixed with Ingredients that will leſſen its Relaxing Property, ſuch as *Coffee*, *Tea*, or any ſort of bitter Herb; for all Bitters contract the Fibres of the Stomach, for which reaſon they are all accounted *Stomachics*.

§ 5. *Coffee* and *Tea* are now become the general Entertainment of the Ladies, and moſt People of Faſhion drink great quantities of them, and without doubt

doubt very often to their prejudice. The Water is very prejudicial to ſome, as the bitterneſs of the *Coffee* and *Tea* is to others, for none who are of a lax habit of Body can bear much Water drinking, nor of a Robuſt and Tenſe Habit many Bitters: So that they who will drink theſe Liquors, ſhould both adapt the Strength and Quantity to their Conſtitutions.

Fat, Moiſt, Phlegmatick People, may drink their *Coffee* very ſtrong, with an empty Stomach, without either Sugar, Milk, or Butter, for the more the Fibres are irritated by it, the more ſtrongly will they contract, and thereby the Stomach will cleanſe its ſelf from all offenſive and ſuperfluous Phlegm, then being admitted into the maſs of Blood, will by encreaſing its Motion, leſſen its Humidity; it will alſo become an univerſal *Stimulus*, and ſo recover the Tone of the Fibres too much relaxed in ſuch a Conſtitution. On the contrary, People of a lean, dry, choleric Conſtitution, ſhould either totally abſtain from it, or drink it weak, with Butter or Sugar, upon a full Stomach, for 'tis to Perſons of this Conſtitution that it is ſo prejudicial, when they

they either take it too ſtrong, or in too great quantities. It dries their ſolid parts, expends the *Serum* of the Blood, gives *Palpitations* of the Heart, Trembling of the Hands, a weak and cloudy Pulſe, oppreſſion at the Breaſt, Syncopies, Aſthma's, and Vapours, it prevents Sleep, and blackens the Teeth, and all this it doth by an active hot pungent Oil. It affords of this Oil by diſtilling in a Retort almoſt double the quantity to either Wheat or Horſe-Beans, for which reaſon it cannot be counterfeited by either of them. *Coffee* yields two Ounce and a half and two Scruples of Oil, whereas the ſame quantity of Wheat yields but an Ounce and ſix Drams, and Horſe-Beans but an Ounce three Drams and ten Grains.

§ 6. What I've ſaid of *Coffee* is moſtly applicable to *Tea*, ſaving that this makes not ſo ſtrong an irritation upon the Fibres as *Coffee* does; both are uſeful in ſuch Caſes where drying Decoctions of the Woods and Lime-Water are proper. *Tea* is uſeful in the Stone. (*m*)

(*m*) Waldſchmid. de Cal. Renum intermonita Medica, Sydenham Opera univerſa *p.* 526. Baglivi de praxi Medica. *p.* 90.

San-

Sanctorius (n) tells us, That *drinking of Water hinders insensible Perspiration, but advances Sensible.* And this not only gives us a hint in what Cases to use it, and what not, but also lets us into the Knowledge of some of its more immediate effects upon the Humors of our Bodies, for since an encreas'd Perspiration is the effect of an encreas'd celerity of the Bloods Motion, or an enlargement of the Pores of the Skin (*by the 20th and 21st Proposition of Animal Secretion*) therefore a diminish'd Perspiration must be the effect of a slower motion in the Blood, or straiter Pores in the Skin: So that Water drinking is proper in *Fevers*, the *Ancients* giving as much as the Patient wou'd drink, as also in all Chronical Distempers in which there is an *Effervescence* of the Humors, such as the *Gout*, *Defluxions*, *Headachs*, *Hysterical Illness*, *Falling Sickness*, *Dull Sight*, *Melancholly*, *Bilious*, *Hæmorhages*, *and Putrifications of the Mouth*, *(o) as* Sir *John Floyer* informs us. The same Author tells us he hath often put by his *Asthmatic Fits* by drinking Water, and certainly nothing

(n) *Aphor.* 67. § 3.
(o) *Treatise of Asthma* p. 176.

is

is leſs flatulent than Water, having leſs *Air* contain'd in its Pores than any other Liquor we uſually drink, as *made Wines* almoſt of all ſorts have the moſt; for which reaſon they are ſo offenſive to weak Stomachs; for being heated in the Stomach, the *Air* contain'd in 'em unfolds its Spring, and forces it way thro' its upper Orifice in belching, if the Fibres of the Stomach be not very ſtrong. Beſides this, this windy ſort of Liquor conveys greater quantities of *Air* into the Maſs of Blood, which will ſo *rarifie* and expand it, as to produce all thoſe Diſorders that Water-drinking is ſo proper to prevent.

§ 7. Our common Spring-Water wou'd perform many of the Cures done by Mineral-Waters, cou'd they be taken in the ſame quantity without any inconvenience, being their Effects upon a humane Body are moſtly ſuch as are owing to ſome obvious Property in Water, ſuch as *diluting* the Blood, *diſſolving* its ſtimulating Salts, *curbing* its Motion, *abating* its Heat, *ſhutting* up the too patent Pores of the Skin, *ſcouring* the Stomach and Urinary Paſſages, *&c.* But great quantities of Water would relax the Fibres of the Stomach, and ſpoil both

both Appetite and Digeſtion, were it not for the *Stipticity* of Mineral Ingredients, which gives thoſe Waters an advantage above others: Beſides, their Salts may be a means of carrying them further into the habit of the Body, and enable them better to open Obſtructions than common Water would, and their Salts being *Vitriolic* in all theſe called *Chalybeats*, may give a better conſiſtence to the Blood grown too lax in Hypochondriac and Scorbutic Bodies.

The great advantage that *Bath*-Water has above others in reſtoring the loſt Appetites of old Debauchees, is owing to its actual warmth, which makes it ſo agreeable to Stomachs accuſtomed to hot Liquors, its Heat makes it more agreeable in the Cholick, tho' the Cure is perform'd by what is common to other Waters, for Water-drinkers are never troubled with this Diſtemper. I have known ſome cur'd by drinking Water, after all other means they've try'd have prov'd unſucceſsful, and upon their drinking fermented Liquors, their Pains have return'd, which they have cur'd again by repeating their former Experiment.

§ 8.

§ 8. The fermented Liquors commonly in use in this Kingdom, are *Ale*, *Beer*, and *Wine*; and there is this common to 'em all when they are thoroughly fermented, *viz.* That they Heat, Intoxicate, force Urine, assuage Hunger, excite Thirst, Stupify, and promote Perspiration, when taken in great quantities. They are lighter, and less glutinous than either *Wort* or *Muste*. These afford more Oil and fix'd Salt by Distillation, both being in a great measure turned into Spirits in the other; so that fermented Liquors contain a great deal of *Sal Volatile Oleosum* in them, by which they become agreeable to the Stomach, by making a gentle titillation upon our sensible Fibres and Membranes, and cause an universal relaxation through the whole *Animal System*. The Blood will, by this means, have a great Impediment to its free circulation removed, the Diameter of all the Arteries being enlarged, a larger Cylinder of Blood will pass through them without touching their sides, from whence the resistance proceeds, the Arteries being Conical, and therefore will move with greater celerity, and consequently encrease the quantity of perspirable Matter

ter and Urine, *(by the 20th Propoſition of Secretion)* as alſo Heat and Thirſt, as I've proved in the Chapter of *Accute Diſtempers.* Hunger being an ungrateful Senſation, they abate that by making a pleaſant one, and all the Symptoms of Drunkenneſs may be accounted for, from an univerſal relaxation. Moreover this *Sal Volatile Oleoſum* of Fermented Liquors, entring into the Maſs of Blood, diſſolves, rarifies and expands it, whereby all the forementioned Effects are more eaſily brought about, and when the rarefaction is exceſſive great, the diſtended Arteries intercept the paſſage of ſo many Spirits into the Heart as to render it unable to contract it ſelf, with force enough to drive the circulating Blood to the extremity of the Body; for which reaſon, People that are very Drunk, are *Pale.* From hence we may infer not only the ſafety but neceſſity of Blood-letting in this Caſe, both when the Pulſe is almoſt inſenſible, and the extreme Parts cold. In this Drunken Condition a vaſt quantity of Blood is thrown into the Brain, and thoſe parts neareſt to the Heart, whereby the Tone of their Fibres are deſtroy'd, (eſpecially if Drunkenneſs be

be often repeated) and become so weak as not to be able to carry on the circulation of the Humors; for which reason hard Drinkers will be Stupid, and subject to *Apoplexies*, *Palsies*, *Vertigo's*, loss of *Memory*, trembling of the *Hands*, loss of *Appetite*, a bad *Digestion*, *Tumors* of the *Liver*, *Spleen*, or *Mesentery*; from whence proceed the *Jaundice* and *Dropsie*, the common fate of most great Drinkers. Now since these Distempers are the effects of Drunkenness, and brought about after the manner assigned, we may hence learn what sort of Strong Drink is the safest to be drunk in great quantities. It must be such as is clear and transparent, and has a dry Pungency upon the Tongue, by which means it will best pass off by Urine and Perspiration. It should also be such as has the least relaxing Property; for which reason the gentle *Stipticity* there is in *Claret*, renders it generally the most wholsome to be Drunk plentifully of any Strong Liquor whatsoever, the great quantity of *Tartar* contain'd in it, prevents it both from relaxing the Stomach, and rarifying the Blood so much as other Spirituous Liquors do.

Tho'

Though exceſs in ſtrong Liquors be ſo prejudicial, yet the moderate uſe of 'em are often of geat Advantage; and certainly they are great Bleſſings to Mankind, in as much as they are ſo very uſeful in ſeveral Caſes, when our Spirits are almoſt Exhauſted by violent Exerciſe or hard Labour, or ſunk by Pains, Sickneſs, or Perturbation of Mind. How comforting is a Glaſs of ſome grateful Spirituous Liquor? It blunts the Senſe of Pain, exhilirates the drooping Spirits, baniſhes Melancholy, ſatisfies Hunger, when Victuals are not to be had; 'tis uſeful in all Diſtempers where the *Pulſe is low*, where the Blood abounds with Serum, where Perſpiration is ſuppreſſed, and when the Paſſions of the Mind are violent; for which reaſon the Hypochondriac, the Hydropic, and ſuch who have newly taken Cold by a ſuppreſſion of Perſpiration, ought to drink Strong-Drink in a moderate quantity. Nay, 'tis beneficial in Fevers, where the lowneſs of the Pulſe, the dejection of the Spirits, and the coldneſs and drineſs of the Skin indicate it. Though it muſt be confeſs'd, that 'tis but few Caſes in which

a cool Regimen is not the most proper.

Wine is generally the most agreeable to the Stomach, of any kind of Fermented Liquor whatever, both on account of its *clearness*, and of the *Tartar* contain'd in it; *Tartar*, or some of its Preparations, being more grateful to the Stomach, in all its Disorders, than any other Medicine; for these Reasons it is that *French Wines*, especially those of *Burgundy* and *Champaign*, are preferable to those of *Portugal*, *Spain*, or any of the sweet Wines, except when we wou'd Drink 'em as a Cordial, in little quantities. These last, though they taste much Stronger and oppress the Stomach, and disorder the Head more than the other, do yet afford much less Spirit by Distillation, their Fermentation being more imperfect, their Oily Parts are unconverted into Spirits, which appears by distilling 'em, for they afford more Oil than the other, and 'tis this half Fermented Oil that makes 'em more difficultly Digested, more Nourishing, and fitter for Men of a dry Constitution. 'Tis to such that *Ale* is more agreeable than Wine, being more soft, smooth,

ſmooth and ſlippery, and conſequently more *Nouriſhing*, and fitter to relax the too tenſe and dry Fibres in ſuch a Conſtitution. But in general, the nearer our *Malt*-Drink approaches to the Nature of Wine, the better it is; therefore it ſhou'd be made of clear Water that will bear Soap, be well *Hopp'd*, that it may keep till all the groſs viſcid Parts are fall'n to the bottom of the Veſſel. It ſhou'd have a dry Taſte, without Sow'rneſs, and be Tranſparent, ſhou'd ſparkle in a Glaſs, but the ſmaller the Bubbles are the better. That *Hopping* of Drink is neceſſary, is evident from this, that without *Hops*, we muſt either drink our *Beer* and *Ale*, *New*, *Roapy*, and half *Fermented*, or elſe Old and Stale, both which are very prejudicial to our Health. Nay, *Hopp'd* Drink is beneficial even in the *Stone*, as I have oft Experienc'd, tho' the common Opinion be againſt it. *Hops* are a grateful Bitter, and therefore a good Antidote againſt both *Stone* and *Gout*, according to the Obſervations of *(p) Sydenham* and

(p) Opera Univerſa, *p.* 418, 419 *and* 526.

(q) *Waldschmiedt*, and if they be not prejudicial in the Stone, there is few Cases in which they will be condemn'd. Tho' it must be own'd that they, as well as all other Bitters, are improper for Persons of a *Hot* and *Choleric* Constitution.

(q) De Calc. Ren. & Arth. inter Monita Medica.

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